Looking Ahead

• As far as we can foresee, there will be no more occasions for special theme issues of FOOD INDUSTRIES in 1933. So far we have covered distribution; raw materials; and packaging. From April, 1933, to January, 1934, the discussions will be chiefly those matters of special interest to men in production and top executives, with enough economic material to enable anyone to chart the direction in which the food industry is going.

• More and more of the kind of information that will permit one to anticipate the future will be found in the Business Trends pages. We believe in business for profits, and that there is no need for dissipating one's company resources (or his own) when it is possible to avoid loss by the exercise of a reasonable amount of foresight and precaution.

Coming Events

• The following are a few of the subjects that will be treated in the immediate future. Every man in food manufacture will find valuable help here.

"What Will the Brewery of the Future Be Like?" Rip Van Winkle has been asleep for thirteen years.

"Using Fresh Strawberries for Candy Production in Vacuum Pans."

"Buying Fuels on a Cost of B.t.u. Basis."

"Why Producers of Seasonal Goods Must Pay More Than Current Market Prices for Raw Materials."

"Accelerating Fermentations by Use of Ultra-Violet-Ray Treatment."

"Changes Occurring in Frozen Foods in Storage."

"New Banana Products."

"Preventing Whitening of Cans in Retorts."

"Humidification in Fruit Ripening."

"Rat Control."

"Spaghetti Canning."

"Chemical Sterilization."

"Modernizing Vinegar Manufacturing Operations."

"Banding a Traveling Package."

"How Yeast Manufacturer Saves a Handsome Sum Yearly on Operations."

"Why a Candy Manufacturer Fumigates All Materials Entering His Plant."

"How to Save Real Money by Controlling Tire Costs in Truck Fleets."

"New Method of Dehydration."

"New Psychrometric Tables That Are Superior to the Older Ones."

"The Ups and Downs of Peach Freezing."

• You will want to follow regularly the presentations of the relation of cosmic data to business conditions which begin in this issue on page 107.

THE EDITORS.

FOOD INDUSTRIES

The Journal Devoted to the Problems of the Food Manufacturer

LAURENCE V. BURTON, *Editor*

M. A. WILLIAMSON, *Publishing Director*

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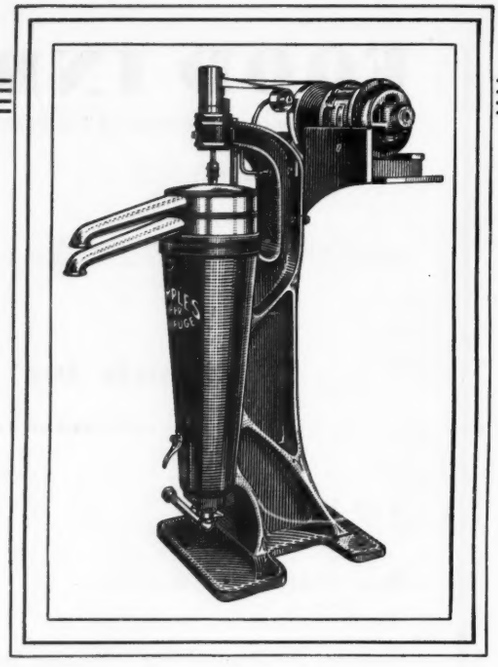

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FOOD INDUSTRIES

The Journal Devoted to the Problems of the Food Manufacturer

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NEW YORK, MARCH, 1933

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Laurence V. Burton, Editor

Supplementing—Not Substituting For—The Perfect Product

IF it were not for the identification that is afforded to present-day products of food manufacture, there would have been no great corporate developments in the food industry such as are known today. It is impossible to conceive of a Heinz, a Campbell, or a Libby; a Schrafft, a P. & G., or a Pillsbury; a Beatrice, a Swift, or a National Sugar without the fundamental tie-up of product and the name of the maker—a tie-up that has characterized American success up to now.

• WHEN one starts to philosophize over the ramifications of this idea there is a tendency to place overemphasis on the attractive package and the trademark value of a well-advertised name. Perhaps we have indulged just that sort of overemphasis in this issue; but, at any rate, we wish to disavow any such intent, for no sadder mistake can be made in life than that of mistaking form for substance.

• AND SO, while we are temporarily lending our editorial spotlight to the broad subject of packaging in this issue, we do not for one moment intend to leave the product itself in the shadow, nor to obscure the work of the men who make it.

• NOTHING will take the place of the perfect product. That, and nothing else, is the indispensable basis for success. Second-rate goods can receive all the possible attention available, and they can be dressed up like Solomon in all his glory. Yet the beautiful form, while it may attract the first sale, will not carry the substance of satisfaction unless the product itself justifies it.

• TO production men in parts of the plant remotely separated from the packing room it is emphasized that your work is every bit as important as that of the bunch who add the finishing touches. In fact, it probably is more important than theirs, for the work of the manufacturing department carries on, clear to the dining table, long after the attractive trappings of commerce have been removed.

• IT RESTS on management to determine the relative emphasis to place on these two functions, for things can run in cycles in this life. Today it is most profitable, and likewise most popular, to develop to the utmost the visual beauty of the packaged product. Tomorrow it may well be that the form surrounding every product will have been developed to the utmost of the capabilities of our poor senses of appreciation, and that the cycle of popular emphasis will then be upon some other merchandising feature.

• YET, after all, no one can mistake the form for the substance and remain long in business.

...AS IT LOOKS TO US

Study Needed

Knowledge of the fundamental economics of one's business, one's industry, one's country is even more important to management than detailed knowledge of shop practice. Be prepared for the time when your opportunity comes to step higher. It takes lots of study to acquire that knowledge. It cannot be gained at the movies, the dance, or at contract.

•

Opportunity

One way to get rid of troublesome competition would be to lease *idle* property for a nominal sum and keep it out of production for a couple of years or longer. For instance, in one state there are between 40 and 50 idle canning plants which cost better than $100,000 each. They can be bought for about $10,000 each, but most of them can be leased for a sum that will barely cover taxes. A small additional sum will secure most of the others.

We would not suggest a conspiracy, but if the going concerns should lease enough idle plants and keep them *idle,* the market price ought to improve in a year to such an extent that it would be a profitable enterprise. And it could be truthfully said to take its pattern from the theory of the vaunted domestic allotment plan.

•

Not Even a Sniff

One could hardly say that our function is that of disease prevention, yet we feel constrained to inform our readers that a generous daily dose of vitamin A in the form of cod liver oil or haliver oil is a very effective guarantee against colds. It seems to be perfectly effective even when one is exposed to colds of the most violent kind.

•

Promoted?

To those who are promoted out of the plant into executive jobs—and promotions are made even in 1933—this suggestion is offered: The new job is a step nearer pure administration. Therefore, look toward that objective rather than make the perfectly understandable mistake of looking backward toward operations. Once out of the plant your new work requires a still newer and broader viewpoint than operations demanded. Good performance of your new management job means success to the old crowd you left behind. They will love you more for that success than to have you interfering in the work you relinquished. Master the job ahead.

•

Liquid Handling

When handling liquid food products it is wise to bear in mind what the act of handling may do to the liquid. If the product happens to be an emulsion, such as whole milk, there is a possibility that the degree of dispersion of the fat globules will be altered in such a way as to affect the depth of the cream line. Borden has been experimenting with compressed air as a means of avoiding such alteration with considerable success. Similarly, foaming liquids offer a problem of pumping that deserves careful study along these lines. Whenever air is used for this purpose, it is imperative that it be clean, dust-free, oil-free, and moisture-free.

•

Relief?

Some approve and others disapprove our attitude toward the allotment plan of farm relief. We have no desire to prolong our own present unhappy economic status, nor that of the rest of the world, for a single day, yet the only form of farm relief that we can foresee as of enduring good is the proposal to lease and take out of production the surplus lands. It is cheap and easy of administration. A one- or two-year mortgage moratorium is all we will concede to those who feel they must make the futile gesture.

•

Cleaning Aluminum

An easy way to clean aluminum utensils and kettles in the plant is to scour them with ordinary mechanics' paste, using plenty of energy. Even burned organic matter can be removed without injury to the metal. The pumice-stone grit should be prevented from sluicing down into valves.

P.S.—Keep this information from your wife, unless you expect to put in a night session on her roasting pan.

Moldy Wrappers

"Sweating, or runny," maple sugar is not always the result of poor boiling technique. Carl Fellers told the Society of American Bacteriologists last December that this condition is more likely to be due to mold growth. Mold spores do not survive even the usual maple-sap boiling operation. His investigations show that wooden and tin containers and wrapping papers are sources of this contamination.

This is only another link in the chain of reasons why the care and handling of wrappers and containers are as important as any of the process operations to which raw materials are subjected to convert them to finished products.

•

Needed Research

Many foolish and costly specifications have been set up by concerns to govern their purchases. Every extra specification, beyond the irreducible minimum, affords the source of supply a chance to charge a higher price. Purchasing specifications should always be as liberal as possible and yet procure a satisfactory delivery.

If you have any surplus help that needs to be kept busy, here is a field of endeavor for some of the better trained and informed. A thorough study of tolerances, purity, weight, thickness, moisture, and the like will reveal places where real money can be saved by determining whether or not the specifications are needed or are unnecessary precautions. When doing this do not be afraid to confer with the sources of supply. They can save time by frank cooperation.

•

Problems Unsolved

Fresh fruits and vegetables during storage are actually living things. A recent study in the Bureau of Plant Industry indicates the possible conclusion that control of the moisture, oxygen and carbon dioxide content in their immediate environment affects the life processes quite as much as does temperature.

The food industries now face the very serious question: Are we going to store goods with atmosphere control as well as temperature control? If the answer is yes, we shall then have many new technical problems to solve after the biologist tells us the ideal atmosphere for each commodity.

Why PACKAGING?

By O. FRED ROST
Marketing Editor, The Business Week

PRODUCTION cannot be sustained profitably unless consumption keeps at least approximately in step with it. Whenever production begins to exceed consumption by any considerable margin an accumulation of surplus stocks results. Efforts to dispose of these incite keener and often less ethical competition. Prices reflect this sharper struggle for available orders, and weaken. Profits are reduced as the margin between cost of production and selling price shrinks. If production proceeds at any ratio that is substantially above consumption, those factors that inevitably have an adverse effect upon prices and profits will gain strength almost in direct proportion to the degree by which production exceeds consumption. Thus the fortunes of the producing branches of industry are definitely and inseparably interdependent upon consumption. If consumption of any commodity lags behind production, every individual engaged in the producing branch, from executive and superintendent down to office boy, must inevitably feel the effect, because goods are made to be sold and if they remain unsold there is little reason for making more.

Foods Need Packaging

This existing dependence of production upon consumption for its ultimate success and profit is accentuated to the highest point in the food industry, because the major portion of its products involve a lesser or greater degree of perishability. Not many products of the food industry may be stored in an indiscriminate manner or for indefinite periods without thereby imposing serious risks of spoilage or total loss upon the owner. Instead, every manufacturer must know and understand the peculiar characteristics of his products and take, as far as possible, every precaution that will guard against spoilage and that will make certain that his product can and will, under normal conditions, reach the ultimate consumer in prime condition. In the accomplishment of this objective, no single factor offers such definite and continuous assurance of protection as is found in proper packaging. It follows that through the adoption of the right kind, type and size of package the average food manufacturer will obtain an important medium for the establishment and maintenance of profitable balance between production and consumption. The force of the influence exerted by this medium upon the final fortune and profit of the manufacturer grows more pronounced when nature or other uncontrollable factors limit the period during which the necessary raw materials or raw products can be obtained.

Objectives of Packaging

Although the many thousands of products of the food industry vary greatly in those characteristics that demand preferred attention when the question of packaging is raised, the final solution of the packaging problem can be achieved only when the basic objectives which are shared equally by all are clearly understood and constantly kept in mind. Of these, the desire to establish identification stands at the head of the list.

Identification

In every branch of industry the need for means of identification of a product has grown in direct proportion to the growth of competition. So long as a manufacturer finds a ready market for all that he can produce he sees no urgent need for identification of his product. When competitors invade his domain and capture some of his trade, nature's first law, self-preservation, becomes operative and the desire to preserve that which he has built dictates that identification of the product be provided.

There are but few products of the food industry that can be stamped or otherwise individually marked for identification, so that the majority of its products must be placed in containers of various kinds to which labels or other marks of identification must be attached, if the objective of identification is to be achieved.

Preservation of the Product

Second only to identification as an objective of packaging is preservation of the product. When a product is sold to the wholesaler, the retailer or the consumer from bulk stocks, the responsibility of its manufacturer ends for all practical purposes when he obtains a "clean" receipt for its shipment from a reputable transportation agency. The fact that, beginning with the shipping platform of the manufacturer, a product passes through many and varied hands, and perhaps changes ownership many times, eliminates substantially all sense of responsibility on his part as to whether or not it reaches each of the hundreds of "final" consumers in prime condition.

This position of non-responsibility is changed into one of complete and sole responsibility just as soon as identification is accomplished. Whenever a manufacturer desires to gain the advantages of greater stability, security and, possibly, larger profits, that may be obtained through complete identification of his product, he must expect to pay

at least partially for those advantages by assuming the responsibility of making certain that his identified products will reach the consumer in prime condition.

Convenience

The third major objective to be achieved through packaging is convenience. To provide the utmost in convenience, a package must facilitate the handling, purchase and removal by the final consumer of the product in such quantities or units as custom dictates. Whenever a package provides a high degree of convenience the added cost of packaging can generally be offset by the higher retail price that the public is willing to pay for it.

The food industry abounds with examples where the presentation of a known commodity in an identifiable convenient package has made possible not merely an increase in price that would cover the cost of packaging but an actual increase in margins, without any adverse effect on the volume of sales. Similarly, the addition of some feature of convenience where a package has already been established and enjoys consumer acceptance will definitely increase the volume of sales.

Stimulation of Sales

Granted that in the design of a package the three major objectives already cited have been definitely achieved, such package may still prove a failure in practice unless the fourth major objective, sales stimulation, is also reached. Many food manufacturers have launched a packaged product where the need for sales stimulation was left entirely out of consideration at the time the package was designed. Often the desire to employ already owned equipment or machinery exerted an overshadowing influence upon the design, shape, size, or exterior of a package. In the early days of packaging practice, the production department frequently had complete and final authority in connection with packaging problems, with the result that some of the packages they produced were doomed to failure even before they reached the retailer.

The experience of important food manufacturers, recorded over a period of years, has demonstrated beyond reasonable doubt that the question of size, shape, design and color combinations of a package is one that the sales and advertising executives must decide.

During the last twenty years the need for the utmost sales appeal in a package has grown with unprecedented rapidity. There is today practically no manufacturer who enjoys a true monopoly in any particular branch of the food industry. Stimulated by the World War and the post-war boom, competition multiplied in every branch, and this resulted in the distribution of sales of any given commodity or product among a larger number of manufacturers.

The normal competition between concerns that actually were manufacturers was further intensified during the period 1919-1929 by an unprecedented increase in the number of private brands. Practically every important agency of food distribution attempted to corral a definite volume of available business by the promotion of the sale of merchandise carrying its own private brand or label and thus obtainable only through or from that particular agency.

Chain-store organizations, operators of voluntary chains, wholesalers who sponsored voluntary chains, even department stores and comparatively small independent food merchants attempted to consolidate their own position by pushing certain lines of goods that carried their own label. Hundreds of food manufacturers condoned the practice by supplying the merchandise and many even furnished the private labels without extra charge. Only since 1930 has this general trend been less pronounced, and since the summer of 1932 evidence is accumulating that it has definitely reversed itself.

If the future should establish this reversal of trend as a *"fait accompli,"* then it will also be easy to demonstrate that the integrity and dignity of the nationally advertised packaged food products served as the bulwark that reversed the flow of a tide of thousands of meaningless brands. In addition, the performance record of most of the manufacturers of packaged and branded foods, particularly their record during the depression years, will provide irrefutable evidence in support of the contention that the proper solution to the packaging problem of a food product is essential to the success of its manufacturer.

The March Toward Packaging

The food industry itself furnishes some outstanding examples to demonstrate how completely and rapidly the consuming public has become converted to the idea that when it buys identified goods in a known package, it buys satisfactory value and valuable satisfaction.

In recent years, thanks to the development of new packaging materials, new packaging machinery, new processes of preservation, improved methods of transportation, the practice of packaging of foods has been extended to include food items that previously were considered unsuitable for packaging.

For instance, vacuum packing has made it possible to pack nut meats in cans and keep them practically indefinitely. The development of transparent wrappings has resulted in creating hundreds of new styles and types of packages which in turn were found to have exceptionally high sales appeal and served to increase the sales of certain food products tremendously.

Many fresh fruits and vegetables reach the city markets in packaged form. Standard cuts of meats, such as steaks and chops, are cut, trimmed and packaged at the plant. Oranges, eggs and walnuts are individually branded so that the ultimate consumer can identify them. Even the casual observer of today is impressed with the

fact that the food industry has become so decidedly package-minded that the time appears to be close at hand when every article of food will reach the ultimate consumer in a container or package.

Due to the rapidity with which the problem of packaging has achieved a position of dominance in the food industry the development of many packages was accomplished without proper consideration of some of the important factors that cannot be disregarded if a package is to prove satisfactory and successful. Such hit-or-miss approach has often resulted in disaster, while manufacturers who attacked their packaging problem seriously and with due regard to all its angles have been able to perfect packages that attained every major objective and have proved successful from the moment of their launching.

The Consumer's Viewpoint

The failure of many food packages can be traced directly to the fact that the designers neglected to remember that they were designing something that the consumer was expected to see and want and buy. It is therefore essential that the habits, traditions and wants of the ultimate consumer be taken into full consideration whenever the packaging

of a product is planned. A careful study should be made of what Mrs. Consumer now buys that is identical or similar; where she is accustomed to buy it; in what quantities she generally prefers to buy it, and how often.

Where a new package is planned for the purpose of direct competition with one or several others already on the market, it is desirable to check consumer reaction to those already on the market by direct inquiry or spot surveys in various localities and neighborhoods. Evident mistakes made by competitors will thus be uncovered and then can be avoided.

When a new product is to be launched, or when it is planned to package a food product that has previously been sold in different form or in bulk, it is highly desirable, too, that the consumers' viewpoint receive the utmost consideration.

Packages in the Retail Store

After the preferences and habits of the consumer in connection with the purchase and consumption of a product have been checked and carefully recorded it is necessary that the various phases in retail buying and selling receive full consideration.

The size of the proposed package must be in keeping with custom and should be such as to reduce sales resistance to a minimum and stimulate the desire to buy.

The design, shape and color scheme must be considered in their relation to various important factors. The shape must facilitate handling and stocking on shelves or for display. The effectiveness of the color scheme must be measured when the package is placed alongside or between other competing brands or products belonging in the same group. It must be remembered that often the consumer will purchase a new brand or product because the package attracted attention or had particular sales appeal. To possess this appeal, a package must have some outstanding characteristics. It must be kept in mind constantly that one of the major objectives of packaging is the stimulation of sales and that the consumer must be made to buy if the production department is to be kept on the payroll.

Packing the Packages

Intimately related to the packaging problem is the problem of packing as it concerns itself with handling and transporting the packaged product from the manufacturer to the wholesaler and to the retailer's store. Many manufacturers and wholesalers have lost valuable customers because they have not changed their methods of packing to meet changed conditions in the retail field.

Chain-store organizations grew at an alarming rate up to 1929. The practices employed by them in supplying their various units, as well as the new and improved type of merchandising practices which they forced upon independent retailers, have resulted in changing the buying habits of retailers. The latter have learned that quick turnover of stocks is essential and they are continually improving their performance in that direction.

Consequently, retailers buy in smaller quantities but buy more often. This means that the wholesaler is forced to do considerable breaking of standard packages and repacking, which has been found to be a costly process, and, furthermore, it interferes with his ability to operate profitably on the small margin with which he must be satisfied today. It therefore follows that any manufacturer who neglects to take into consideration the viewpoint of the wholesaler when packing problems are settled, is likely to lose the cooperation of many.

To pack a packaged food product in the right number of units and in the right type of container demands complete knowledge of the wholesaler's and retailer's functions and habits.

Within the limits of this article it has been possible to cover only some of the obvious factors that demand attention when a problem of packaging is to be solved. No attempt has been made to elaborate on the necessity that every package must protect the product from the factory right through to the final consumer. Instead, it was considered desirable to stress those factors which frequently receive no consideration or at best only inadequate treatment.

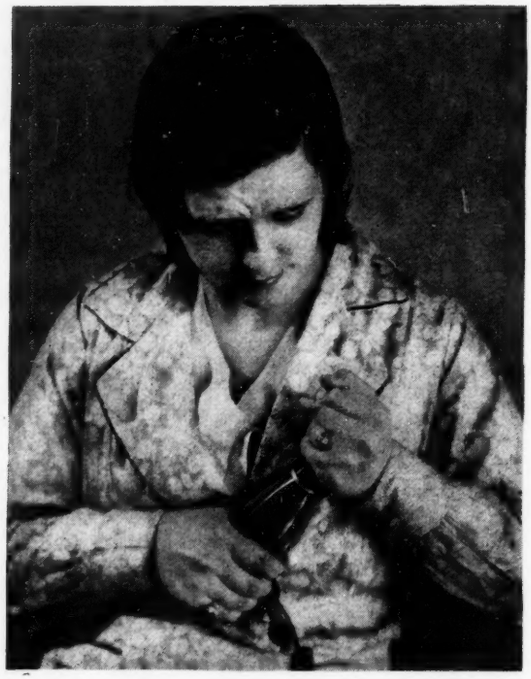
Profit in Packaging

It has been frequently stated in recent years that the problem of packaging must command the constant and preferred attention of every manufacturer of food products. That there is more than a grain of truth in this contention is effectively demonstrated by the many improvements and changes in packaging that have been made by important food manufacturers during recent years. For instance, it is a well-known fact that General Foods Corp. is continually experimenting with new types, styles and sizes of packages and maintains an elaborate research organization in this field.

The Kraft-Phenix Cheese Corp. has just launched a complete new line of cheeses that are offered in individual packages that were designed only after a most exhaustive study. Bread, biscuit, candy and beverage sales have been stimulated and increased far beyond normal ratios as the result of new or improved packages. No food manufacturer can expect to stay in business unless he is prepared to know the packaging problems in his particular field from every angle.

How Strong Is a Woman?

Can She Unscrew the Tops From the Jars and Bottles She Buys?



By M. L. CARR
Director of Laboratory
Pittsburgh Testing Laboratory
Pittsburgh, Pa.

● This investigation of the mechanical force which your customers must exert to open a bottle or jar is one of the earliest engineering approaches to consumer problems of which we have any knowledge. It suggests a host of other studies that ought to be made on the consumer as a power-producing unit.

● Regardless of what type of package you are using, you will want to read this series of articles.—The Editor.

JUST how does a woman get the cap off a bottle or jar, a feat that at times will baffle the efforts of the strongest man? Modern living conditions are kind to the housewife, providing her with all sorts of conveniences and labor-saving devices. However, with the passing of the sale of commodities in bulk, certain tests of strength in the opening of containers face the woman of today that her grandmother and mother did not have to meet.

To determine the magnitude of the problem, obtain some idea of what the average housewife does to solve it, and find out how successful are her efforts, the Pittsburgh Testing Laboratory has just completed a series of tests that will be reported in this and two succeeding articles. These tests were confined to screw caps, a type of closure widely used on containers for food and other products.

The first series of tests was to determine how much strength a woman could exert with her bare hands, unaided by any tool or device, when opening a standard screw cap. The method employed was to tighten a cap on a container to some arbitrary value, using a specially designed apparatus. The container was then handed to a housewife with the request that she remove the cap with her hands, in her accustomed manner. If she succeeded in doing so, the cap was replaced, but screwed on tighter. If she did not succeed, the cap was removed, tightened to a lesser value, and given to her again.

This procedure was followed until a definite value was obtained just above the maximum effort that the woman could exert in removing the cap. After she had made several attempts to remove the cap and admitted failure, the cap was removed by the test apparatus, the necessary effort being recorded.

This test apparatus consisted of two clamps and a calibrated spring balance. One of the clamps was designed to hold rigidly any shape and height of container from 1 to 10 in. in diameter. The second clamp was a split clamp designed to be fastened around the screw cap, lined with rubber so that it would not damage the cap when it was tightened in position. The tightness was adjusted by means of wing nuts, which were screwed down just enough to keep the clamp from slipping. Two of these cap clamps were made, one for each of the two sizes of caps—28 mm. and 63 mm.—selected for the test.

This apparatus was used by attaching the spring balance to one of several screw-eyes fastened in the extended arm or handle of the cap clamp at definite distances from the center of the cap. The product of the distance from the hook to the cap center multiplied by the reading in pounds on the spring balance when it was pulled upon hard enough to unscrew the cap gave the effort required in inch-pounds. The proper length of the twisting arm, or distance from the cap center to the eye hook where the spring balance was attached, was determined by the tightness of the cap. The capacity of the spring balance was 10 lb. and the maximum length of the arm 12 in., making the maximum capacity of the apparatus 120 inch-pounds.

Representative housewives, 27 of them, made trials of their strength in

this way and determined the maximum twisting effort that they were able to exert. The results obtained are set forth in the accompanying table, which also includes some of the remarks made by the women. They used only their bare hands in making this test, but some instinctively desired to use some other means, showing that experience had taught them that they might encounter difficulties. One housewife remarked that it was foolish to exert oneself in trying to remove a tight cap without first hitting the cap flat on the table. Other women expressed fear of breaking the container if it was hit on a hard surface, and advocated soaking the cap in hot water to loosen it. One woman thought that caps that were difficult to remove had probably been placed on crooked or cross-threaded at the factory.

The remarks made by some of the women who cooperated in this test, to the effect that they very seldom opened containers of this type, or that they gave them to their husbands or some other members of their families, indicated that often the task is beyond their strength. Many of them, however, have been forced by necessity to develop methods of opening, such as using a knife to pry between the cap and the container, or cutting with a can opener, which, while crude, time-consuming and perhaps dangerous, are generally effective.

The bottles used for the 28-mm. tests were all of the pint-vinegar-bottle type. Those used for the 63-mm. tests were all jars approximately three inches in diameter and four inches high. With the 28-mm. bottles, the weakest woman could exert a twisting force of but 11.6 inch-pounds, as compared to the 29.6 inch-pounds of the strongest woman, while the average for all those tested was 18.5 inch-pounds. The figures for the 63-mm. caps were 29.6 for the weakest woman, 54.7 for the strongest, and 42.1 inch-pounds for the average.

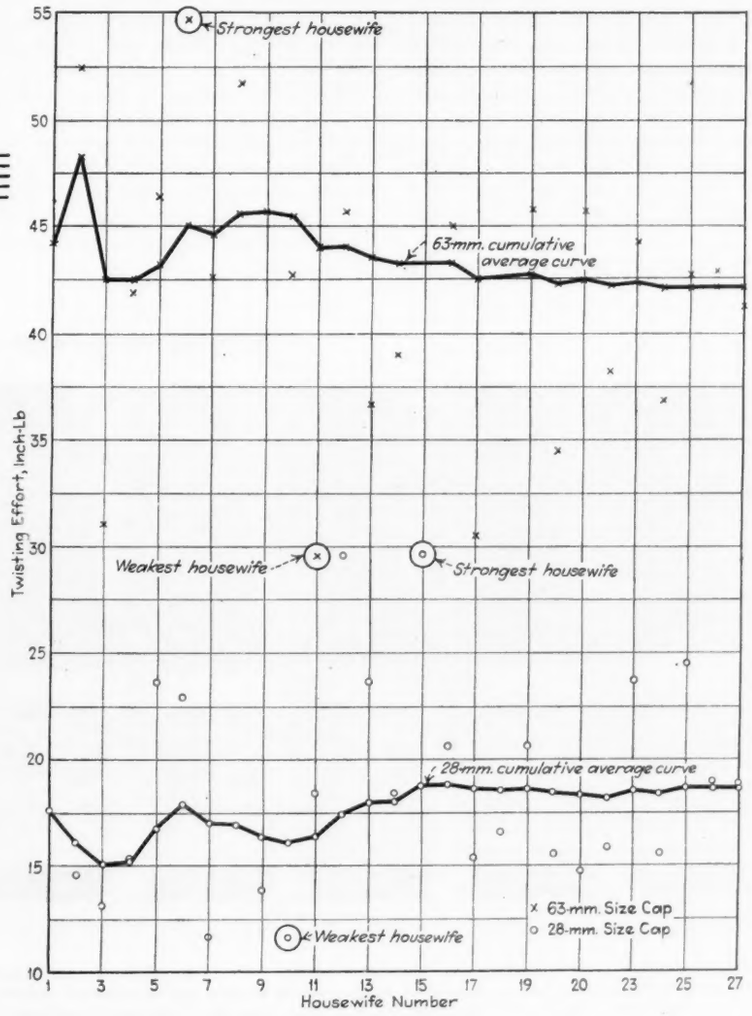
On the chart are shown the progressive average or accumulated average curves for the tests of both sizes of cap. These average curves approach a straight line, showing that sufficient data have been obtained from which average values representing housewives in general can be determined. Each point on the curves represents the average of all the individual values up to that point. It is evident that the average for the first 17 housewives is about the same as that for the whole group of 27. Experience with averages established in this way has shown us that increasing the number of tests will change the value of the average but little, even though the maximum and minimum value might change. So we can consider that 11.6 inch-pounds for 28-mm. caps and 29.6 inch-pounds for 63-mm. caps are good working values for the twisting force that the average woman can exert in removing screw caps of these sizes.

How does this compare with the effort that she will need to put forth? To determine this, tests were carried out on filled containers purchased from a number of stores, to obtain the inch-pounds of force required for removing the caps. These tests were then compared to the results of the tests just discussed. In FOOD INDUSTRIES for April, this second group of tests will be discussed and compared to the first group.

Results of Tests to Determine the Twisting Effort Which Housewives Can Exert Upon Bottle Caps

Housewife No.	Inch-Lbs. Opening Capacity 28-mm. Size	63-mm. Size	Remarks of Housewives
1	17.6	44.2	If cap sticks, give to someone else to open
2	14.6	42.4	Hit around edge of cap with knife
3	13.1	31.1	Give to someone else to open
4	15.3	41.9	Very seldom opens this type of cap
5	23.6	46.4	No remarks
6	22.9	54.7	Give to husband to open
7	11.6	42.7	Give to some other person in family
8	16.9	51.7	Invert container, strike on top of table
9	13.8	45.7	Try some other method to loosen
10	11.6	42.7	No remarks upon sticking; stated painted caps easier to grip
11	18.3	29.6	Hit flat on top of table
12	29.6	45.7	Not bothered with caps sticking
13	23.6	36.7	Give to husband to remove
14	18.3	39.0	Give to some other member of family to remove
15	29.6	....	Hit flat on top of table
16	20.6	45.0	Soak in hot water
17	15.3	30.4	Soak in hot water
18	16.5	42.7	Try different ways — hot water, tap, etc.
19	20.6	45.8	Hit cap flat with hand, or use can opener to pry
20	15.4	34.5	Hit cap flat on hard surface and use can opener
21	14.6	45.7	Hit edge of cap with heavy tool
22	15.7	38.2	Hit edge of cap with heavy tool
23	23.6	44.2	Tap edge of cap on table
24	15.4	36.8	Soak bottle and cap in hot water
25	24.4	42.7	Hit edge of cap against hard surface
26	18.8	42.8	Use knife to pry between cap and bottle
27	18.7	41.2	Use knife to pry between cap and bottle.
Aver.	18.5	42.1	
Min.	11.6	29.6	
Max.	29.6	54.7	

Twisting effort which housewives could exert on bottle caps, also progressive average curves for the two sizes of caps tested.



Passing Judgment on Package Redesign

By RAY M. SCHMITZ
Secretary of the Carton Committee
General Foods Corp.
New York, N. Y.

TO be successful, business must be alert to constructive changes. Research must be continuous to discover and perfect new methods. Whenever possible, established products must be improved and new products added to the line. Nothing in business is more constant than change, and that holds true particularly in the food industry.

In that branch of the food industry ordinarily classified as the grocery field, this state of constant change has not been confined to the product alone, but instead producers in that field have been forced to give steadily increasing attention to the problem of packaging. In fact, some producers contend that the firm entrenchment of packaged goods as the principal unit of sales is one of the chief developments of the last twenty years.

In recent years, the packaging problem has assumed special importance through changing methods of certain types of food retailers. For instance, the self-service grocers employ massed package displays as a means of stimulating sales, and the regular service retailers are changing the general layout of their stores to employ open displays of merchandise more extensively than before, so that modern package design must take these factors into account.

It is natural, therefore, that a manufacturer of grocery products should, in the intense competition for consumers' interest, give thought to changes in the design of packages that will make them more effective in massed arrangement and that will help the packages to carry more adequately the impressions which the manufacturer wishes to have associated with his products. Progressive management, therefore, in carrying out aggressive merchandising policies, is giving extra attention to the package, and the attitude of General Foods Corp. presumably is typical of this new interest.

In the field of packaging, General Foods employs practically every type of container that is used in the food business today. We use tin, glass, cardboard cartons, bags, barrels, drums, and, of course, a wide range of packing processes.

During the past 2½ years we have changed the dress of seventeen of our major package items and introduced eight new products. At this writing there are a few more package changes in process, and our research department is preparing to release a number of new products that will require package designs. In addition to these package changes and new package developments for the consumer trade, we introduced a number of package changes in the group of bulk products that are sold by our various interests to institutions, manufacturing outlets and other large users.

Out of this variety of experiences, involving a large variety of products with distinctly differing characteristics as well as practically every known type of packaging material, has been evolved a practical procedure for the consideration and adoption of packages or package changes.

A complete history of

Reading from left to right: the first bottle is the 1920 package with the recipe on the back of the label. In 1921 the recipe booklet was tied to the bottle. Then it was put into a glassine bag with the bottle. The big improvement was the patented recess in the bottle behind the label, into which the recipe booklet fitted. After that the label was improved

After the formulation of tentative design changes in packages, the various parts of our organization are called upon for a cooperative working out of the details incidental to final production. This means that, since General Foods Corp. comprises fourteen separate manufacturing units, the cumulative experience of those fourteen units is pooled in making the final decision. While it is true that there are today various sources which are drawn upon from time to time for competent design talent, we have felt increasingly the value of the combined experiences of our fourteen divisions in carrying out packaging changes, particularly when unusual problems are presented.

Color

Color is the keynote of every package of consumer goods. The modern grocery store abounds in color, so that the first question to decide is, What color or colors should our package have? The color or colors must serve to express correctly the product. The colors must be such that the package will stand out among others.

Often these questions are solved—but in water colors on the artist's sketch, where the ordinary processes of reproduction use ink. This means that the transparent water color must be approximated in the more opaque ink. If the final results are to represent exactly what was wanted, however, every element of chance must be removed.

For example, in redesigning our Jell-O package, the final approval was not given until we first made a set of engraver's plates of the face panel. Then we had electrotypes made and cartons were printed on the regular presses in various colors until we finally obtained the color values that we considered satisfactory.

By this process of using actual plates, the actual carton material, and having the printing done on the same presses with the ink that it is proposed to use, we can know exactly how the carton will look in actual production and thereby eliminate costly mistakes or disappointing results.

In the creation of new labels we are similarly careful. After the design and color scheme are found acceptable we experiment with different methods of production. One type of label will be more satisfactory if printed, while other designs will reproduce to better advantage if lithographed, and so we try all methods and then adopt the best.

Practical Tests

It has been found that in some cases the laboratory tests of packages are not sufficient, particularly when final acceptance of a new design of label or package will eventually involve large quantities. Some package changes represent new departures in form of container as well as design. When this happens we subject the proposed "new" package to limited market tests. Earlier in our experience we found that some so-called "acid tests" developed minor points for improvement. In one instance a limited exposure test resulted in changes of a label which materially aided visibility and, in addition, suggested two improvements in the physical design of the container.

Such experiences naturally add to our store of information, upon which we call when similar problems arise and serve as a guide to other tests that may be devised for the purpose of insuring an even greater factor of satisfaction and success of new packages or redesigns. Thus, when we start production for wide

In redesigning the Jell-O package, final approval was withheld until regular presswork was done on the new package.

redesign of a package

successively. Then the bottle took on a different color until at the extreme right is shown the latest model of Certo package. Note the cycle of names on the label, starting with "Fruit Pectin" and ending with "Certo Fruit Pectin." Labels on the opposite page are designs used by the predecessor companies

distribution we can be fairly certain that no unforeseen package or design difficulties will crop up.

In some instances we have found the marketing tests of particular advantage. These involve the actual distribution and sale under the regularly encountered conditions, but only in limited and especially selected areas. Then the entire process is studied carefully so as to develop possible improvements before actual general distribution is undertaken.

A Case in Point

The evolution of the bottle and label used for Certo provides an excellent example of experience that has served to formulate the process. Originally Certo was produced in 1920 and distributed on a rather small scale. On the back of the label was printed a general recipe for making jams and jellies. It was found that this general recipe was not sufficient nor did its appearance on the label produce the best results.

The following year a recipe booklet containing numerous recipes was printed and packed in the packing cases with the idea that the retailer should tie it around the bottle when placing it on display. It was found that this plan did not work out, and that the final consumers did not often get the recipe booklet.

To overcome this difficulty it was decided to inclose both bottle and recipe booklet in a glassine bag at the plant so that the grocer would more or less automatically keep both together and deliver them to the consumer. While this seemd to solve the problem of getting the booklet to the consumer, it was found to have the disadvantage of reducing materially the display value of the package.

After various experiments we developed and patented a special bottle with a recessed panel into which the recipe book fitted and would be held in place by the label. This solved the problem of the recipe book, and that feature has not since been changed.

The Certo label has been changed a number of times, however, and each of the bottles in the accompanying photograph represents a different label. Some of these changes merely involve a different type or an improved arrangement, while others represent a rearrangement or new colors or new background design. When it is remembered that each change in label means new plates and other expenses, this example serves to illustrate the importance that is attached to this problem.

It is only fair to say that some designers of packages and certain printers and lithographers are aware of the minor pitfalls that lie immediately *beyond* the acceptance of a design. They set their task to furnish an almost finished result for approval, so that little divergence is left for the final reproduction. With the greater interest in package design now being fostered by the packaging industry this type of presentation will no doubt widen.

Consumers Study the Package

Because of the fact that the package as the accepted unit of sale is continually gaining wider acceptance, it is only natural that in making package changes a manufacturer should receive direct consumer reactions. Letters arrive from users of the product who commend or condemn the change, and then the preponderance of one over the other will give a cross-section of consumer reaction. Some of the criticisms may seem trival, but it is wise, nevertheless, to leave as little opening as possible for justified criticism.

Our mail brings us almost daily some one or more suggestions for a new style of package. Many of these are quite involved. However, each receives careful consideration—even those that display a complete lack of understanding of even the elementary factors in packaging. We receive many worked-out designs for new packages or new labels, and because each represents a definite consumer interest we give proper consideration to all.

Packaging Is Big Business

It is perhaps unnecessary to emphasize the point that all packaging, in order to prove successful, must first of all be so designed that, regardless of what the product may be, it will serve to the utmost to insure that that product will reach the final consumer in the best possible condition.

To accomplish this, General Foods Corp. employs for each product the most suitable packaging process, and of these the consumer is particularly familiar with the vacuum packing, the Vita-Pack, various types of carton filling, automatic bag filling, and the like.

Just how much is involved in the packaging problem of a company such as General Foods Corp., with its fourteen separate manufacturing units, is illustrated by the volume of packaging units consumed annually. In the aggregate our company uses each year hundreds of millions of cartons, cans and labels for various products. In addition to these requirements, millions of other assorted types and sizes of containers are purchased.

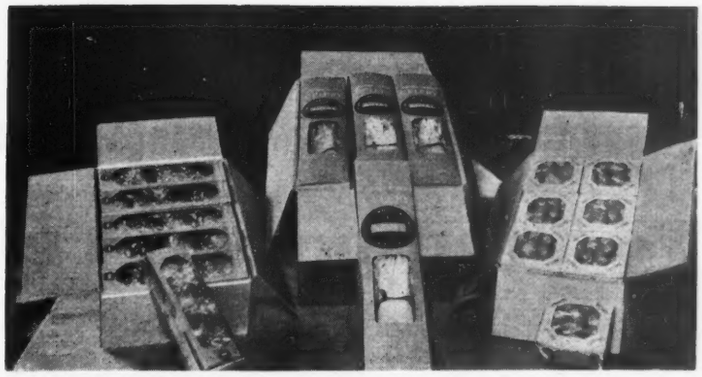
Despite the fact that many of the General Foods packages have been changed in recent years, package design will continue to be a live subject for consideration. Our research laboratories are constantly working on improvements in products and on the development of new ones, all of which, when perfected, will require suitable packages in order to win consumer acceptance. Furthermore, present packages may outlive their period of usefulness, and that will mean further changes and new designs Just so long as the package is the means by which the consumer identifies the product, just so long will the subject of packaging continue to merit front-rank attention.

As long as the package is the means by which the consumer identifies the product, just so long will the subject of packaging continue to merit front-rank attention.

EVERY PACKAGE A SHOWCASE

For Fresh Foods

By FRANK K. LAWLER
Editorial Department
Food Industries



Tomatoes, celery and brussel sprouts in the new "moistureproof" boxes with transparent cellulose windows. The tomatoes are packaged with crushed transparent cellulose, making them more enticing. These "fancy" foods were packed by Atlantic Commission Co. at its Jersey City plant.

DISTRIBUTORS of fresh fruits and vegetables are no longer depending entirely upon the naturally endowed lusciousness of their products to loosen the purse strings of the consumer. Beginning their sales-appeal tactics by washing vegetables and culling fruits, the distributors later adopted parchment and cellulose wrappings. Now they are coming out with individual consumer packages.

The new containers are of cardboard, heavily waxed to make it moistureproof, and they have a glued-in transparent cellulose window that permits the prospective buyer to see the product and enjoy its freshness. The boxes are closed without sealing and are not absolutely airtight, but the closing flaps fit snugly enough to make the loss of moisture very gradual.

This method of packaging apparently holds many advantages for the manufacturer, distributor and consumer. It keeps the product fresh long after it otherwise would be dried and shriveled to so much waste; in one test tomatoes were not desiccated after six weeks in one of the boxes. It provides a means of identifying fruits and vegetables with the producer's name or trademark. It makes one stalk of celery or pound of tomatoes look just like another and keeps the housewife from picking over the supply on the grocer's shelves, thereby keeping the produce from being bruised or broken and at the same time keeping it sanitary. Since the individual packages are packed in large cartons—twelve to the carton for celery and ten for tomatoes—they are conveniently shipped and handled. Besides, they obviate the return and repair of wooden crates.

Since the use of these containers is still in the experimental stage, it is difficult to predict the disadvantages of the method. Judging from actual production operations, it seems that labor costs will be somewhat higher. In the case of celery, it takes more time to put the hearts in the box than it does to wrap them in parchment paper or transparent cellulose. And for those products packed by weight, as tomatoes, weighing out the small quantities necessitates some delay. Up to the point of packaging, the production procedure is the same as for handling "fancy" quality fruits and vegetables by other methods.

In addition to the extra labor required, the producer must, of course, bear the cost of the containers. But from present indications is seems that the product will bring a price sufficiently high to cover all additional costs with some to spare. The difference in the price of celery hearts packed in boxes and wrapped in parchment paper has been ranging from 3 to 8 cents.

Developed by Robert Gair Co., Inc., the new individual consumer packages are being used by Schlesinger & Corso, Inc., New York, N. Y., celery distributors, for its Mayflower brand of celery and by the Atlantic Commission Co., which distributes through stores of the Great Atlantic & Pacific Tea Co. Not only is the Atlantic Commission packaging celery in boxes but it is handling other products in that way. Mushrooms, tomatoes and cranberries are put up in 1-lb. packages, apples in 2-lb. consumer units and brussel sprouts in pint and quart containers. The volume of produce put in the boxes is not large as yet. Celery is the principal product being packed in the "moistureproof" display containers, and Schlesinger & Corso and Atlantic Commission are handling about 20 and 10 per cent, respectively, of their business in this manner. Incidentally, celery is admirably adapted to moistureproof packaging, since it is placed in the boxes immediately after washing and while still wet.

Packing "fancy" quality celery in boxes at the Jersey City plant of Atlantic Commission Co. Note the girl on the left putting the celery in one of the boxes. This production line-up also wraps celery hearts in parchment paper and transparent cellulose. Before packing, the celery is washed either by the spray washer in the background or by a brush washer which is not shown.

Adapting
Automatic Wrapping Machines
To Transparent Cellulose

In bread wrapping is found a very severe duty for automatic wrapping machines where bakers are using transparent cellulose for bread wrappers. They require the same machines to wrap both waxed paper and cellulose, and use both materials every night. The author, who has fought through this problem when in the employ of one of the largest bakers, gives the results of his experience.

By JOHN D. CONTI
Sylvania Industrial Corp.
New York, N. Y.

THE growing popularity and increasing use of transparent cellulose as a wrapper for food products has resulted in changed conditions for machine-wrapping operations. Most manufacturers of automatic wrapping machines are today producing machines designed for the use of transparent cellulose, yet there are still in use many of the older types of machines, originally designed for other or coarser types of paper. This article relates primarily to the use of transparent cellulose on the latter types of machines, but the recommendations contained herein will in most cases apply equally as well to the newer types.

Fig. 1—Proper cutting of the wrapping material is highly important. Two types of cutting knives are commonly used on automatic wrapping machines. Any wax or dirt at the bottom of the notches will seriously interfere with proper cutting.

Fig. 2—Cross-section of staggered wire guides which confer a momentary stiffness to a soft paper and permit it to be pushed flat without crumpling.

Transparent cellulose is regenerated cellulose, a substance occurring in nature. Its natural characteristics are entirely different from those of other types of paper, and it cannot successfully be used in the same manner as the latter without providing means of handling its inherent characteristics and differing qualities.

Most of the machines originally designed for the coarser types of paper can be converted to the use of transparent cellulose. The manufacturers of these machines and the manufacturers of cellulose have made a careful study of the problem of conversion and are prepared to offer specific recommendations for this purpose. For example: The usual types of bread-wrapping machines can be successfully converted to the use of moistureproof transparent cellulose without preventing their continued use of waxed paper.

In converting these machines and in using the machines of the newer types, there are important precautions to be observed. It is imperative that the machine be thoroughly cleaned before attempting to use transparent cellulose, and special attention should be given to the folding plates. Any wax or dirt on these parts will have a tendency to create a drag and hold back the folds. A cloth dampened with divider oil or gasoline may be used for removing wax. Incrustations and accumulations of scale are easily removed by rubbing with medium steel wool.

Extreme care should be exercised in the handling of rolls of transparent cellulose to avoid damage to the face and ends of the rolls. Before feeding the paper through the machine, the operator should guard against burrs or dirt on any of the surfaces over which the cellulose travels. Careful attention should be paid to centering the sheet and adjusting the guides. Transparent cellulose requires a fine adjustment for proper control of the sheet. The tension should be carefully adjusted to obtain a uniform and steady "pull."

A very important operation in the use of transparent cellulose is that of cutting off the individual wrapper, which is done by several methods. Some machines use a rotary type cutoff which cuts the sheet while it is in motion, while others of the shear type cut the sheet when it stops temporarily for this purpose. The shear type is the more positive.

The principal difficulties encountered in the cutting are splitting of the sheet, partial cutting or perforations, and occasionally no cutting at all. These difficulties may be caused by any of several conditions. For example, if the machine has been previously used for waxed paper, the accumulation of wax on the knife will prevent it from cutting transparent cellulose. The knife should be thoroughly cleaned. If the sheet is not held taut or if one edge of the sheet is held tighter than the

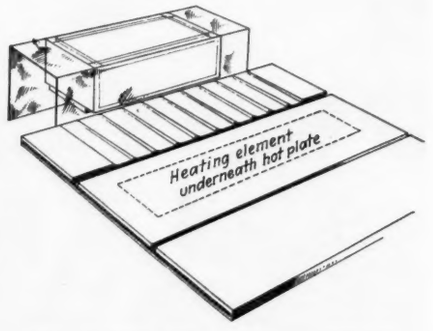


Fig. 3—The hot plate is separated from the rest of the machine to limit the heat to the desired area. Ribs raise the paper off the flow plate and thereby reduce the frictional pull.

other, a partially cut sheet usually results.

If the sheet has a tendency to split or shatter when cut, the cellulose should be checked for brittleness. Transparent cellulose is susceptible to atmospheric conditions and, if not properly stored, has a tendency to dry out. Manufacturers of this product recommend to their customers the temperatures and humidity under which the material is best stored.

If the paper is in prime condition, the knife should be dressed or sharpened and carefully adjusted, or a new knife installed. If the paper has a tendency to brittleness, before removing the knife, the operator should measure the distance it projects and, when replacing it, reduce the distance by about $\frac{1}{32}$ in. In other words, he should reduce the distance the knife penetrates the cellulose. It also is advisable to have the knife set at a slight angle to produce a shearing action.

With the increasing use of transparent cellulose there have been developments in knife design. One result is

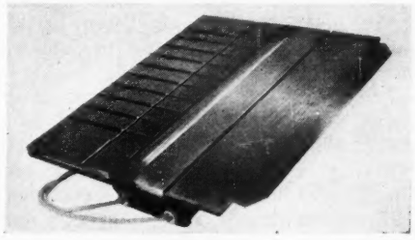


Fig. 4—An improvement over the hot plate for heat-sealing is the hot roller, separated from the rest of the machine to localize the heat to the desired spot. Only the roller is heated.

that a saw-tooth edged knife is becoming popular for the rotary type of cutter (see Fig. 1). Feeding methods are either "push" or "pull," both of which are satisfactory in the handling of transparent cellulose. The "push" method consists of feeding the paper through two revolving rolls, with the top roller usually supplying the tension. This top roller generally is made of or faced with cork, rubber, hardwood or material of similar density. The bottom roller usually is of steel. The top roller is made of the softer material to give it a firm grip on the sheet, which is particularly advantageous in feeding transparent cellulose.

The "pull" method is accomplished either by passing the paper around the article to be wrapped and then pulling to the desired length before cutting, or grippers pull the sheet to the desired length after cutting, and then pass it around the package. In either of the "pull" methods, the proper tension of the sheet is of utmost importance.

In the "push" feed method, the principal difficulty is the possible "buckling" of the transparent cellulose, which is

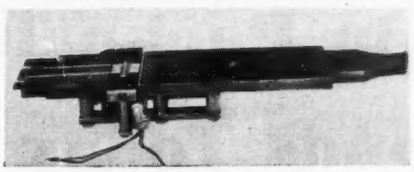


Fig. 5—Showing the manner of inserting the roller in the flow-plate for heat-sealing of moistureproof transparent cellulose wrappings.

quite flexible. This is easily overcome by the use of staggered wire guides, as illustrated in Fig. 2. These guides cause undulations, which have the effect of momentarily stiffening the paper, making it possible to feed very soft cellulose. No difficulty is to be anticipated where the sheet is pulled across by grippers or carried to position on small belts or pulled into position by the wrapped article in the manner previously described.

Transparent cellulose has a very smooth non-granular surface. Therefore, it has a tendency to cling to other smooth surfaces. Because of the character of transparent cellulose, its movement can be retarded also by an accumulation of scale and other dirt. It is advisable to install ribs on the plates over which the cellulose travels, thereby reducing the friction or contact area to a minimum and thus eliminating all possible drag. These ribs can be made by laying small wires across the plate as illustrated at *A* in Fig. 3. They are seen also in Fig. 4. In all instances, drag or friction should be eliminated as much as possible.

One of the most attractive features of moistureproof transparent cellulose is its ability to seal with heat and without the use of solvents or adhesives. This heat-seal is accomplished by fusing the coating of the paper, and, unlike waxed paper, this does not remain in a molten state as long as the heat is applied. Wax paper, while in contact with heat, is fluxed and its movement across the plates is really facilitated by the heat.

Transparent cellulose, on the other hand, when sealed, immediately hardens, and continued application of heat has a tendency to create a tackiness and a drag on its movement. Therefore the ideal sealing of moistureproof transparent cellulose by heat is by vertical pressure without sliding or dragging, which, of course, is not possible in all types of machines. Continued application of heat at the point of seal will tend to scorch the paper. This can easily be noticed by the color. Overheating will also cause brittleness to occur before the scorching takes place. Therefore it is desirable to confine the sealing heat to as narrow an area as possible. For this purpose, a heat-sealing roller has been designed, which will be described later.

A temperature of approximately 300 deg. F. usually is best for joining two thicknesses of moistureproof cellulose by heat-sealing at the bottom or side seams. For a greater number of thicknesses, such as occur at the ends or in the folds, higher temperatures are necessary. Care should be exercised not to overheat these end plates, however, for reasons already explained. In any case, better seals are obtained by instantaneous rather than by prolonged application of heat. It is desirable to seal the bottom as close as possible to the elevator, although this is not practical on all types of machines. Where it is possible, an effective method of applying heat to the bottom seal is to cut the plate (on which the package travels) in three sections, using the center as a "hot plate," leaving an air gap of approximately $\frac{1}{8}$ in. between sections (see Fig. 3).

The front plate preceding the hot section should be ribbed. The ribs should project about $\frac{1}{16}$ in. above the face of the plate and should be spaced (according to the size of the plate) from $\frac{1}{2}$ to $1\frac{1}{4}$ in. This early sealing of the bottom of the package will greatly facilitate the folding and sealing of the ends and tend to eliminate the pull-back or drag on the bottom lap. In strapping these sections of the plate together, asbestos insulation should be used to eliminate conductivity of heat.

It is very important that the folding plates on all machines be carefully adjusted and kept thoroughly clean and free from dirt, incrustations and scale. They should be adjusted just close enough to allow the package free and smooth passage, but without unnecessary play.

The heat-sealing plates following the folders also must be kept clean and free from dirt, incrustations or scale, to avoid any dragging or pull-back, for it is at this point that the wrapping of the whole package may be distorted. These plates should be carefully adjusted to give just sufficient pressure for efficient sealing but to avoid excessive pressure.

The heat-sealing roller mentioned herein is a device developed by the service engineers of the Sylvania Industrial Corp. It consists of a free-action roller built into and projecting above the face of the metal plate. The roller is in an insulated chamber, heated electrically, thereby confining the heat to the roller (see Figs. 4 and 5). This device has proved very efficient in sealing transparent cellulose by heat, due to the revolving action of the roller which provides vertical pressure at the time of sealing and eliminates all drag and friction. Incidentally, this roller also is a great improvement over the old method of sealing waxed paper. It entirely eliminates hot plates.

Manufacturers of automatic wrapping machines have also developed other devices and changes for the heat-sealing of moistureproof transparent cellulose.

Where Carton Packaging Of Foods Stands Today

By E. S. STATELER
Assistant Editor, Food Industries

FACED with the realities of a critical buyers' market and a steady decrease in consumer buying power, food producers have resorted to various expedients to maintain their volume of business. Some have sought to do this by marketing packaged consumer products in which commodities formerly sold in bulk are the chief ingredients. Others have sought to tap these new markets by introducing sectionally-famed foods, in prepared and packaged form, into other territories. Still others, especially those already established as producers of packaged foods, have met the challenge of commodity competition and the demand for greater value for money spent by redesigning their packages.

These changes have varied from giving the package a more appropriate and pleasing external appearance to a greater content for the same price. The significant trend has been the receptive attitude of package-food producers to the use of new materials for and methods of packaging which will add to the appearance of the package, the shelf-life of its contents, or to the physical identification of the contents through transparent containers. Among the more far-sighted food manufacturers has been the move to adopt containers which open easily and which have reclosure features.

All of these adoptions and changes are made with the object of wooing sales, particularly profitable sales, at as near the same unit price as is possible.

In all this maneuvering for profitable sales, one of the most concerned men, in companies making changes in packaging, is the production man. He is the one who has the responsibility of getting the finished product onto the shipping room floor at a cost that will permit profitable marketing. Because this is true, wooers of profitable sales, before they adopt startling changes in their packages, should take stock of what the production man has available with which to handle the new package or what it will cost in time and money for him to get the necessary equipment.

Packaging machinery has been developed to meet the demands made on it. In the days of expanding markets, every opportunity was sought to make the public package-conscious. At the same time, ample inducements encouraged machine builders and makers of package materials to aid in satisfying the demands that were created. Under this impetus manual operations progressively became semi-automatic and full-automatic as rapidly as the market demand justified and as machines and packaging materials could be developed.

The result was that machine and container designing was directed toward that which would give the maximum production at the lowest unit cost. Standardization in size, shape and general construction was the dominant trend. Only in this way could output be speeded up sufficiently to keep unit costs low enough to encourage demand and a supply adequate to meet the demand. Machines of this high-speed automatic type perforce must be exact in their operation and must be coordinated with other units in an installation to give smooth, uniform performance. Some of these machines are non-adjustable and exemplify the extreme interpretation of the philosophy of one type of the present-day machine builder. He is convinced that the package should be built to the machine. The more recent market conditions have given rise to demands for machines that can handle packages of varying sizes. As a consequence most of the automatic machines have been redesigned to handle packages varying between certain minimum and maximum dimensions. However, their adjustment cannot, except through narrow ranges, be made without interchange of working units. These units represent spare parts and their cost must be regarded as a specific charge against the products which call for their use. The expense for which these units can be had is a small part of the expense of getting an individual machine to handle packages that do not fall within the narrow limits obtainable on a non-adjustable machine.

Some users of automatic packaging

Bottom Sealing Machines

Manufacturer	Model	Type	Motor Size, H.P.	Packages Per Minute	Style Carton	Carton Size in Inches‡ Minimum L. W. D.	Carton Size in Inches‡ Maximum L. W. D.	Time to Make Change Min.
Consolidated Packaging Machinery Corp., Buffalo, N.Y.	.....	Automatic, hand fd.	.....	15–40	Seal end	2¼x1¾x⅞	10x8x5§	.....
	.....	Semi-automatic.....	.....	15–20	Seal end	All sizes		.....
J. L. Ferguson Co., Joliet, Ill.	Packomatic....	Automatic.....	2	20–40	Seal end	2⅜x1¼x3¾	9x6x3¾	.....
Johnson Automatic Sealer Co., Ltd., Battle Creek, Mich.	A	Automatic hand feed	2	60–90	Seal end	4x1¼x¾	10½x7x4	40 min.
	B		2	60–90	Seal end	4x2x1	12½x7x4	40 min.
	C		2	50–60	Seal end	6x4x2	10x7x6	2 hr.
	CFC	Automatic with feeder combination	3	70–80	Seal end	6x3½x2	10x6½x4	2 hr.
	CFD		2	70–80	and side	2½x1½x1	6x3½x2	2 hr.
	CFF		3	60	seam	6x3½x2	12x8x4	2 hr.
Pneumatic Scale Corp., Ltd., Norfolk Downs, Mass.	Classes 1111 to 1119.....	Automatic with carton feeder.....	1½	30	Seal end	3x2x1	9¼x6¼x3¾	45 min.
	1116.....	Hand feed.....	½	30	Seal end	2½x1¼x¾	12x8¼x4	30 min.
	1117.....	Semi-automatic....	¼	12–15	Seal end	2x1x½	*10½x8x5	30 min.
		Automatic with carton feeder.....	1½	60	Seal end	3x2x1	9¼x6¼x3¾	45 min.
Stokes & Smith Co., Philadelphia, Pa.	American.....	Automatic hand feed	1	30–40	Seal end	†3x1½x¾	11x7x4	30 min.
Triangle Package Machinery Co., Chicago, Ill.	Class A.....	Semi-automatic carton form.....	½	20–25	Seal end	All sizes		10 min.
	Class SM.....	Semi-automatic.....	⅓	18–25	Seal end	All sizes		10 min.
	Class SR.....	Semi-automatic portable.....	¼	20–25	Seal end	All sizes up to 3¼ in. depth		10 min.

*Total carton length with flaps extended must not exceed 14½ in. †Two sizes of machines for this range. ‡From middle of score line to middle of score line. §Maximum dimension on any face. In no case should the length plus the depth (thickness) or the length plus ½ the width total more than 12 in.

machinery are inclined to be unreasonable in their demands for flexibility. They are setting up a cry for machines that will automatically adjust themselves, or at least lend themselves to ready manual adjustment, to handle packages varying in size and shape as fed to them. Even to the machine builders who have the philosophy that a machine should be built to handle the package, this demand is too radical for fulfillment at this time—particularly because this extreme flexibility is wanted without an appreciable loss in speed and at approximately the cost of a less flexible machine.

However, as unreasonable as some of the demands are, demands for flexibility are not being made in vain. The advent of transparent wrapping materials and the increasing demand for means by which rapidly changing market conditions can be met have caused packaging machines to go through many changes even in the past few months. Particularly is this true in the case of wrapping machines. Their builders are being called upon to meet specific demands occasioned by the rapidly changing market conditions. However, it is still true that one cannot have speed, full flexibility and low first cost embodied in one machine as yet. Even in these days one must expect to pay more for a specially designed machine than for a standard one.

Strange as it may now seem, packaging of food did not originate for the purpose of adding to the food manufacturer's expense and the production department's problems. Nor has it reached its present state of importance to satisfy the ambition of the machine builders, package designers and manufacturers of packaging materials who have profited by its growth. It had its beginning in an increasing demand for food in a better state of preservation and wholesomeness. With this benefit became associated greater convenience for use, storage and handling. While these utilitarian features have their advantages and still play a prominent part in the packaging of food, appeal to the physical senses to establish identity has become a factor of growing importance.

It is this more recent thinking in packaging that is adding to the problems of the food manufacturer and of machine builders. In some quarters there is a tendency to forget that packaging must be done in the factory instead of in an office or studio and that it must be done by machines, if the unit cost is to be kept sufficiently low to meet successfully the demands of competitive markets.

It is with the thought of benefit to those who are now contemplating the addition of packaged products to their line or changes in their packaging operations that FOOD INDUSTRIES undertakes the publication of suggestive information regarding various types of packaging equipment available.

No attempt is being made to place comparative importance on any form of packaging. The limited amount of space available for the first study necessitates that it be limited to one form of packaging and to representative equipment essential to this form. Carton packaging happens to be the form chosen.

In this connection, carton construction is an essential factor. The size, shape and composition of the carton are largely dependent upon the character of the product it is to contain and the market to be reached. The competitive situation in the food field is such that food-containing cartons must give maximum protection to the product and add the minimum to cost of production. In addition, they must lend themselves as advantageously as possible to means of attracting the potential purchaser.

The primary principle in carton construction is: The more simple in form, the lower will be its material cost and the easier it can be handled on the standard packaging machine. It is for this reason that, generally speaking, rectangular shaped cartons are preferred. Their average width is approximately twice the short dimension (thickness or depth) and three-fifths the long dimension (length). This range of dimensions holds as being average, although a survey of a large number of widely diversified food-containing cartons shows a range in size from $3\frac{1}{2}$x$2\frac{3}{4}$x$1\frac{1}{2}$ in. to $9\frac{3}{4}$x$5\frac{1}{4}$x$2\frac{1}{2}$ in. In all these cartons the practice is to have the grain of the board from which the carton is made run around the carton to give it as much resistance as possible to splitting or tearing along the edges.

In the side-seam and end-seal style carton, the width of the side-seam lap is approximately one-half inch, although it may vary one-eighth inch either way, depending upon the size and construction of the carton. To give added strength to the seam and to prevent sifting losses, this side-seam strip may —or, rather, should—extend at least one-half inch beyond the score line at each end and be glued to the corresponding end flap.

The outside pair of flaps on each end may or may not be of equal length. However, they must not be longer than the carton's shortest dimension and should overlap each other sufficiently to give a secure seal when the carton is closed. The inside end flaps should be shorter than the outside flaps so as not to overlap nor interfere with operations of automatic feeders, fillers and sealers. The surfaces of these flaps must be kept free from ink, varnish, wax, and other surface-treating substances which might interfere with the sealing of the carton.

Crackers, biscuits and alimentary paste cartons are generally cut out of chip-board in the form of blanks to be assembled on a carton-forming machine of the Peters type, in which the end flaps are interlocked with each other. These cartons have a tucked-in top closure which is made secure and held in place by an outside wrapper.

When cartons of the seal-end style are to be printed, they are likely to be made from white patent coated manila-lined board or white patent coated news-lined board. In either case the board will have a No. 3 or No. 4 finish and a minimum thickness of 0.018 in. $+ \frac{\text{volume of carton in cubic inches.}}{20{,}000}$

Although this caliper specification also holds for loose and tight-wrapped cartons made from other stock, it should be regarded as a minimum thickness. The character and weight of the material to be contained by the carton should be taken into consideration and the thickness increased accordingly.

In instances where the carton is to be subsequently wrapped or labeled with

Top Sealing Machines

Manufacturer	Model	Type	Motor Size, H.P.	Packages Per Minute	Style Carton	Carton Size in Inches† Minimum L. W. D.	Carton Size in Inches† Maximum L. W. D.	Time to Make Change Min.
Consolidated Packaging Machinery Corp., Buffalo, N.Y.	.....	Automatic, hand fd.	.....	15–40	Seal end	2¼x1¾x7⅛	10x8x5‡	....
		Semi-automatic.....	.....	15–20	Seal end	All sizes		....
J. L. Ferguson Co., Joliet, Ill.	Packomatic.....	Automatic.....	1	Up to 60	Seal end	3x1⅞x¾	8x5x3	....
Johnson Automatic Sealer Co., Ltd., Battle Creek, Mich.	A	Automatic double entry	1	60–90	Seal end	4x1¼x¾	8x6x4	30
	B		1	60–90	Seal end	4x1¼x¾	12½x7x4	30
	C		1	50–60	Seal end	6x4x2	10x7x6	30
Pneumatic Scale Corp., Ltd., Norfolk Downs, Mass.	Class 3121.....	Automatic.....	¾	30	Seal end	2½x1¼x¾	9⅜x7¾x4⅜	15–30
	Class 3122.....	Automatic.....	¾	60	Seal end	2½x1¼x¾	9⅜x7¾x4⅜	15–30
	Class 3124.....	Semi-automatic.....	¼	12–15	Seal end	2½x1¼x¾	10⅞x7¾x5	
Stokes & Smith Co., Philadelphia, Pa.	American.....	Automatic.....	1	30–40	Seal end	3x1½x¾	11x7x4*	30
Triangle Package Machinery Co., Chicago, Ill.	Class S M.....	Semi-automatic.....	½	18–25	Seal end	All sizes		10
	Class S R.....	Semi-automatic portable.....	¼	20–25	Seal end	All sizes to 3¼-in. depth		10

*Two sizes of machines for this range. †From middle of score line on one end to include thickness of flap on other end.
‡Maximum dimension on any face. In no case should the length plus the depth (thickness) or the length plus ½ the width total more than 12 in.

a tight or a loose wrapper, the stock may be bleached manila-lined chipboard or unbleached single manila-lined chipboard. In cases where the carton is to have a separate lining and an outside wrap, it probably will be made from good quality chipboard. Other type boards may be and are used, but not in such quantities as the ones designated. Among these other boards one of the most important and widely used has an asphalt layer to give added moistureproof quality to the carton. For flour, powdered sugar and other similar products in which whiteness of color play a psychological part, blue colored news-lined board is used.

Within the past few months a reclosure type of carton, made from any of the better grades of bending-board stock such as the lined manilas or manila-lined chipboards, has been adopted in the food field. This carton may be of a printed-stock type or of the outside-wrapper type. Another style carton which has been growing in popularity is the one with a transparent panel or window which enables the prospective customer to inspect the contents of the package without breaking its seal or otherwise destroying the protective features of the carton. The popularity of this style carton with production men has been greatly influenced by the developments which have been made in the processed cellulose materials and in adhesives which fasten these materials to cardboard surfaces.

The dimensions of a carton represents edge-to-edge measurements. In the case of folded cartons or blanks they are taken from the middle of the score line to the middle of the score line, with the cartons spread out on a flat surface.

Inner lining materials consist largely of vegetable parchment, plain or waxed glassine, plain or waxed sulphite or oiled papers, and plain or backed foil. The latest development in lining materials are transparent laminated papers and moisture-proof processed cellulose materials.

Depending upon the nature of the food products to be contained in the carton and the rôle which the lining is to play, the lining is chosen on a basis of comparative cost, its grease-, dust-, air-, and moisture-proof qualities, and its resistance to splitting or tearing after the carton is sealed.

These linings may be separate and apart from the carton or they may be attached to the inside of the carton by means of wax or adhesive. In some instances, lining machines interlock the folds or liners with the flaps of the carton to give greater protection to the contents of the carton against loss by sifting and weevil infestation from the outside as well as against absorption or loss of moisture.

When these lining materials are fed from rolls, they are formed into carton shapes under pressure around block attachments on the lining machine. The over-all dimensions of the block are the same as the inside dimensions of the carton after it is lined. Subsequently, the lining is inserted into the carton and released from the block. The top of the liner is rolled or folded as the carton passes through the top-sealing machine to make a full seal inside the carton.

In some cases, the liner is heat-sealed to form a complete inner package. In other cases the top of the liner is folded or rolled and the ends are lapped over the inner flap of the carton to be securely held in place by the sealing of the outer flap. In still other instances, the waxed inner liner is heat-sealed to the inner surface of the carton, and the end interfolded with the flap in the carton. These methods insure that the liner will be uniformly and completely fitted into the carton and that it will have the construction of a sealed inner container for the contents of the package.

In all cases the adjustability of a lining machine consists of replacing the liner-forming block of one carton size for those of the desired size. Each block size is usable only for the carton whose inside dimensions after lining are the same as the edge-to-edge measurement of the block. Also, while lining machines are listed as having a minimum and maximum range of adjustability, it is not advisable to try to use the same machine through the whole range of from one extreme to the other. For example, a machine might have a minimum and maximum range of cartons varying from those having a 4-oz. capacity to those having a 5-lb. capacity. Yet, one machine should not be used for the entire range. It would be better to have a machine to handle packages from 4 oz. to 1 or 2 lb. capacity. Another machine of the same model but slightly different in construction should be used for packages from 2- or 2½-lb. to the 5-lb. size.

When the liners are fed into the machine in sheet form along with the blanks, the width of the liner is equal to the length of the package plus twice

Combination Top and Bottom Sealing Machines

Manufacturer	Model	Type	Motor Size, H.P.	Packages Per Minute	Style Carton	Carton Size in Inches‡ Minimum L. W. D.	Carton Size in Inches‡ Maximum L. W. D.	Time to Make Change Min.
J. L. Ferguson Co., Joliet, Ill.	Packomatic	Automatic	..	Up to 60	Seal end	3x1⅞x¾	8x5x3	..
Johnson Automatic Sealer Co., Ltd., Battle Creek, Mich.	G	Automatic	3	30–45	Seal end	4x1¼x1	10½x7x4	40
	J	Automatic	3	60–90	Seal end	4x1¼x1	10½x7x4	60
	F	Automatic	3	20–25	Seal end	6x4x2	12x8x6	60
	T.B.S.	Automatic	1	25–30	Seal end	3x2x1	10x8x4	30–40
Pneumatic Scale Corp., Ltd., Norfolk Downs, Mass.	Duplex	Automatic, hand fd.	½	20–30	Seal end	2½x1¼x¾	9⅜x7¾x4⅜	20
Stokes & Smith Co., Philadelphia, Pa.	American	Automatic hand feed	1 or 2	30–40	Seal end	*3x1½x¾	11x7x4	30
	Neverstop	Automatic	½–3	60–70	Seal end	†2¾x1⅝x¾	10½x6½x4½	..
	B, C, D, E, & F.	Hand or machine feed						
Triangle Package Machinery Co., Chicago, Ill.	Class S A	Semi-automatic	1	20–25	Seal end	All sizes up to 11 in. hgt.		10
	Class S I	Semi-automatic	¾	20–25	Seal end	All sizes		10

*Two sizes of machines for this range. †Five sizes of machines for this range. Not usually made adjustable.
‡From middle of score line on one end to include thickness of flap on other end.

Filling and Sealing Machines

Manufacturer	Model	Type	Motor Size, H.P.	Packages Per Minute	Style Carton	Carton Size in Inches† Minimum L. W. D.	Carton Size in Inches† Maximum L. W. D.	Time to Make Change
J. L. Ferguson Co., Joliet, Ill.	Packomatic	Automatic, net weigher, bottom and top sealer	2	Up to 60	Seal end	3x1⅞x¾	8x5x3	.....
Fred Goat Co., Inc., Brooklyn, N. Y.	FF	Automatic,* net weigher or volumetric filler	¾	35–70	Seal end	2¾x2½x1¼	3¾x3x1⅜	Not adjustable
	NFF							
Hoepner Automatic Machinery Corp., Buffalo, N. Y.	.....	Automatic, net weigher, bottom and top sealer	.....	40	Seal end	All sizes		
Johnson Automatic Sealer Co., Battle Creek, Mich.	TBS	Automatic, net weigher, bottom and top sealer	1	20–25	Seal end	3x2x1	10x8x4	30-40 min.
Pneumatic Scale Corp., Ltd., Norfolk Downs, Mass.	Class 3711	Automatic, volumetric, bottom and top sealer	½ or ¾	60	Seal end	2¼x1¾x⅞	7x4x2¼	Not adjustable

*Liner is in reality a separate and crimp-sealed inner package of dry waxed paper. †From middle of score line on one end to include thickness of flap on other end.

the width of the bottom panel of the carton—the bottom panel determines the quantity of paper necessary to cover the ends of the carton by interlocking with the end flaps. The length of the liner sheet is equal to twice the width of the bottom panel plus twice the height of the carton plus the width of the top closing flap minus $\frac{1}{8}$ in. These sheet dimensions apply particularly to liners used on the machines of the Peters type, which interlocks or folds the liners in the flaps of the carton.

In some instances where the lining material is fed into a combination automatic lining and sealing machine from a roll, the carton flats are also fed in and formed around the liner-forming block by side-sealing as well as by bottom-sealing. In most cases, the cartons are side-sealed previously in the carton-making shop and the lining is done in connection with bottom-sealing, filling, and top-sealing operations. In the case of packaging dessert powders and the like, the inner liner is frequently made from a sheet of oiled paper into a bag; filled, folded across the top and crimped shut before being inserted into the bottom sealed carton. Other times it is a parchment envelope whose top is interfolded and sealed with the end flaps.

Both bottom and top sealing operations consist of applying adhesive to the underside of the outer flaps of the carton and holding them in place under pressure until the inner and outer flaps adhere to each other to give a firm seal. In semi-automatic units the adhesive is applied manually, whereas in full-automatic units it is mechanically applied as the carton passes through the unit to the next operation. In the full-automatic unit, the carton is opened mechanically as it passes from the feeder into the bottom sealer and is held securely in normal shape by a block, whose outside dimensions are the same as the inside dimensions of the carton, while the adhesive is being applied. The carton then passes on to the next station to be lined or filled. In some units the carton is lined and bottom-sealed simultaneously. In top-sealing, the contents of the filled carton tend to hold it in proper shape and position while it passes through the sealer. In any instance only one carton size can be handled by these units at a time or on each adjusted position. Also for each carton size handled on the machine there must be a corresponding replaceable block form as a spare part.

When both sealers are included in one machine, or the same unit is used as a top and bottom sealer, they generally are combined with a net or gross weight weighing or a volumetric filling unit.

Dimension measurements given for cartons handled by bottom sealers are from the middle of the score-line to the middle of the score-line, whereas those given for the top sealers and combination sealers include the thickness of the lap on one end.

Outside Wrappers

External wrappers are called upon to identify the package, to enhance its appearance and to lend advertising value as well as be protective. They consist mainly of lithographed or letter-printed machine-finished label, vegetable parchment, plain or waxed glassine, plain or waxed sulphite, or kraft papers, plain or backed foil, and transparent processed cellulose materials. Quite generally the transparent wrappings are added to give protection to the printed or decorated surfaces of the carton, regardless of whether the advertising or decorative media are on the carton itself or on its wrapper.

Loose wrappers generally are rectangular in shape and are fed into the wrapping machine in sheet form or in a continuous manner from rolls. If a printed wrapper be fed from a roll, either an all-over design or pattern is used or the wrapping machine is equipped with a registering device, such as an electric eye, to insure proper placing of the panel design on the carton. These wrappers may be used with or without end-seals. If used

Carton Lining Machines

Manufacturer	Model	Type	Motor Size, Hp.	Packages per Minute	Style Carton	Carton Size in Inches—Minimum L. W. D.	Carton Size in Inches—Maximum L. W. D.	Liner Material	Time to Make Change
J. L. Ferguson Co., Joliet, Ill.	Packomatic	Automatic roll feed.....	1	25–35	Seal end.....	3 x2 x1	7x5 x4	Glassine, parchment or plain paper.....	
Fred Goat Co., Inc., Brooklyn, N. Y.	.....	Automatic roll feed, adjustable	1	60–70	Seal end.....	Any size	Any size	Glassine, parchment, Waxed, sulphite, foil, processed cellulose...	1 hr
Johnson Automatic Sealer Co., Ltd., Battle Creek, Mich.	A	Automatic roll feed combined with bottom sealer and carton feeder	3	60	Seal end and side seam	6x3½x2	10x6½x4	Glassine, parchment, waxed sulphite, foil, processed cellulose	2 hr
	D			75		6x3½x2	10x6½x4		
	F			60		6x3½x2	12x8 x4		
Peters Machinery Co., Chicago, Ill.	E	Semi-automatic sheet feed	½	40	Colonial lock blank	2 x1 x ⅞	18 x6 x5	Parchment, glassine, waxed paper, oiled paper, backed foil	
	EJ	Standard automatic sheet feed	¼	35–40	Colonial lock blank	2 x1 x ⅞	9 x3½x3		
	EJ	Large frame semi-automatic sheet feed	½	35–40	Colonial lock blank	6 x4 x4	11 x5½x4		
	E	Automatic roll feed	½	.....	Colonial lock blank	2x 1 x ⅞	18 x6 x5		
Pneumatic Scale Corp., Ltd., Norfolk Downs, Mass.	Class 4131..	Automatic roll feed.....	¾	28–30	Seal end or tuck end	5½x3 x1½	$13^{15}/_{16}$x8 x5	Parchment, glassine, waxed paper, foil	45 min.
	Class 4141..	Automatic roll feed.....	¾	28–30	Seal end or tuck end	2½x1¼x ¾	9½ x5¼x$3^{13}/_{32}$		

Automatic Loose Wrapping and Carton Packing

Manufacturer	Model	Packages per Min.	Weight of Bar	Size of Bar in Inches L. W. D.	Style of Pack	Wrapper Feed	Roll Width, In.	Length Cut-off In.	Wrapper Material	Stock Weight, Lb.	Roll Diam., In.	Core, In.
Automat Molding & Folding Co., Toledo, Ohio	A.....	80	1-lb. bar	4¾x2½ x2½	Individual.....	Roll	8	11	Parchment§.....	30	13	3
		80	1-lb. roll	4¾x2$^{9}/_{16}$x2$^{9}/_{16}$	Not put in carton	Roll	8	11	Waxed glassine.....	30	13	3
		with ⅝ in. radius on corners										
	C.....	100	¼-lb. bar	4¾x1¼ x1¼	Individual.....	Roll	6⅜	5½	Waxed sulphite.....	30	13	3
	F.....	100	¼-lb. bar	4¾x1¼ x1¼	4 in 1 carton.....	Roll	6⅜	5½	Processed cellulose (plain or moistureproof).....	No. 300	8	3
	H.....	80	½-lb. bar	4¾x2½ x1¼	2 in. 1 carton.....	Roll	6⅜	8¼				
	K.....	80	½-lb. bar	4¾x2½ x1¼	Individual.....	Roll	6⅜	8¼	Same as above			
	PA.....	80	1-lb. bar	4⅞x2⅞ x2⅛	Individual.....	Roll	8	11				
	WA.....	80	1-lb. bar	6½x3 x1½	Individual.....	Roll	8½	10				
	WF.....	100	¼-lb. bar	3¼x1½ x1½	4 in 1 carton.....	Roll	5¼	5				
	FH.....	100	¼-lb. bar*	4¾x1¼ x1¼	4 in 1 carton.....	Roll	6⅜	5½	Outside carton is made from heavily waxed .016 in. solid manila board, is loose wrapped around bars, and closed by tuck in ends. Inside dimensions are same as outside dimensions of wrapped bars measured from edge to edge.			
		50	½-lb. bar*	4¾x2½ x1¼	2 in 1 carton.....	Roll	6⅜	8¼				
		65	1-lb. bar†	4¾x2½ x2½	Individual.....	Roll	8	11				
	Triplex.....	80	½-lb. bar*	4¾x2½ x1¼	2 in 1 carton.....	Roll	6⅜	8¼				
		100	¼-lb. bar*	4¾x1¼ x1¼	4 in 1 carton.....	Roll	6⅜	5½				
	Country Roll	80	1-lb. roll	5 in. length x 2¾ dia.	Not put in carton	Roll	8½	11				

All of these machines wrap with single or double wrappers under wet or dry conditions. * Requires only simple adjustment. † Requires separate unit.
§ A 13-inch roll of 30-lb. parchment gives 10,500 wrappers for ¼-lb. bar, 7,000 for ½-lb. bar, and 5,250 for 1-lb. bar wrapped on machines of types A and PA. This means that a 13-inch roll of 30-lb. parchment will give 2,625 pound packages each containing 4 one-quarter pound bars, 3,500 each containing 2 one-half pound bars and 5,250 containing solid 1-lb. bars.

Tight Wrapping Machines

Manufacturer	Model	Type	Motor Size Hp.	Package Feed	Packages per Min.	*Carton Size in Inches Min. L.	W.	D.	Max. L.	W.	D.	Wrapping Materials, Lb.	Sheet Size in Inches Min.	Max.	Sheet Form	Sealing Lap, Inch
Pneumatic Scale Corp. Ltd., Norfolk Downs, Mass.	Class No. 5214	Automatic adjustable	1	Belt conv.	60–70	2¾	x1¾	x1⁵⁄₁₆	7	x3¾	x2	50–55‡	4⅜	x5⅞	9½ x12	Rectangular	½
	Class No. 5218	Automatic adjustable	½	Belt conv.	60–70	4¼	x2⅝	x1½	10⅝	x7¾	x3¾	50–55‡	6¼	x10¾	14⅜ x23½	Rectangular	½
Stokes & Smith Philadelphia, Pa.	101	Semi-automatic adjustable	2 of 1 each	Hand	10–15	3	x1⅜	x½	12½	x5	x3	50§	4¼	x 4½	16¼ x16¾	Die cut	⅝-¾ on side ½ on ends
	106 A, B, & C	Automatic, may be adjustable	1½-2	Belt conv.	60–70	†3¾	x1½	x1	11	x 7	x4	50§	5½	x 5¾	15¾ x22¾	Die cut and/ or rectangular	⅝-¾ on side ½ on ends

* Edge to edge measurements. † Three sizes of machines for this range. ‡ Basis machine-finish label stock. § Basis machine-finish label stock varnished or plain.

Carton or Bar Wrapping and Labeling Machines

Manufacturer	Model	Type	Motor Size, Hp.	Package Feed	Packages per Min.	*Package Dimensions in In. Length Min., In.	Length Max., In.	Width Min., In.	Width Max., In.	Depth Min., In.	Depth Max., In.	Wrapping Material	Roll Width or Sheet Width	Diameter of Roll, In.	Core, In.	Length of Roll Cut-off or Sheet Length	Sealing Lap of Wrapper	Printed Paper Label Feed	Label Width Min., In.	Label Width Max., In.	Label Length Min., In.	Label Length Max., In.	Sealing Lap of Label, In.
Package Machinery Co. Springfield, Mass.	C	Adjust.	¾	Magazine and belt conveyor	70–100	3	9¼	¾	4⁹⁄₁₆	⅛	1	Glassine, Plain	12¾	10	3	11¾	Bottom— ½ in. on Foil ¾ in. on Paper Ends—½ to 1 in.	Sheet	1	8⅝	3⁷⁄₁₆	11⅞	1-2
												Paper, Dry Wax	12¾	10	3	11¾							
												Foil, Backed	12¾	10	3	11¾							
												Foil, Tin	12¾	4	1⁹⁄₁₆	11¾							
												Aluminum	12¾	6	1⁹⁄₁₆	11¾							
	CA	Adjust.	½	Magazine, chain and belt conveyor	130 80–90	1¼	4⅝	⅝	1¾	⅛	¾	Glassine	6¼	10	3	4½	½ to ¾ in. on bottom and ⅜ to 1 in. under ends	Sheet	1⅛	4½	2⅜	4⅝	⅛-1
												Paper, Dry Wax	6¼	10	3	4½							
												Foil, Backed	6¼	10	3	4½							
												Foil, Tin	6¼	4	1⁹⁄₁₆	4½							
												Aluminum	6¼	6	1⁹⁄₁₆	4½							
	CA-2	Adjust.	½	Magazine, belt conveyor chain	120 80–90	1¼	5½	¾	2¼	⅛	¾	Glassine	7¼	10	3	6	⅜ to 1 in. bottom; ½ to ¾ in. under ends	Sheet	1⅛	5⅜	2¼	7	⅛-1¼
												Paper, Dry Wax	7¼	10	3	6							
												Foil, Backed	7¼	10	3	6							
												Foil, Tin	7¼	4	1⁹⁄₁₆	6							
												Aluminum	7¼	6	1⁹⁄₁₆	6							
	N-4	Adjust.	½-¾	Belt or chain conveyor	100–120	2¾	6	1⁹⁄₁₆	3	½	2	Paper	9	14	3	12	1 to 1½ in. bottom	Sheet	2¾	9	5⅛	12	1
												Proc. cellulose	9	8	3	12							
	S	Adjust.	½-¾	Magazine belt conveyor chain conveyor	160	1½	4½	1	2¾	¼	1¾	Paper	6	10	3	8	½ to 1 in. bottom	Sheet	2	6	....	7¼	1
												Glassine	6	10	3	8							
												Proc. cellulose	6	8	3	8							

* While machines are adjustable to handle packages within these limits, no one package should have the three minimum nor the three maximum dimensions. Measurements are from edge to edge.

Loose Wrapping Machines

Model	Type	Motor Size H. P.	Package Feed	Packages Per Minute	*Package size in inches Minimum L. W. D.	Maximum L. W. D.	Wrapping Material	Wrapper Feed	Width of Roll or Width of Sheet Inches	Diam. of Roll Inches	Core Inches	Length of Roll Cut Off or Length of Sheet Inches	Sealing Lap, In.
Battle Creek Wrapping Machine Co., Battle Creek, Mich.													
CC	Automatic Non-Adjustable	½	Belt or chain conv.	25–35	3½x2x1	7x4½x3	Processed Cellulose...	Roll	18	12	3	16	½-1
33C	Convertible	1	.....	55–70	4x2x¾	11x5¾x3½	Processed Cellulose with or without electric eye.....	Roll	20	12	3	16	½-1‡
33N	Convertible	1	.....	55–70	4x2½x1¼	8x4½x2¼		Roll	20	12	3	16	½-1§
33	Convertible	1	.....	55–70	4½x2x1	13x4½x4⅜	Waxed paper with or without electric eye	Roll	20	12	3	16	½-1
33L	Convertible	1	.....	55–70	4½x2x1	13x7x4⅜		Roll	23½	12	3	16	½-1
33M	Convertible	1	Mag. or belt conv....	60–125	3x1⅜x⅝	10x3½x3½		Roll	15	12	3	16	½-1
CLC	Adjustable	½	Chain conveyor.....	25–35	6x3x2	11½x6x5½		Roll	18	12	3	24	½-1
CLC-1	Adjustable	½	Chain conveyor.....	25–35	4x3x2	10x5x4	Waxed paper	Roll	18	12	3	20	½-1
CLC-7	Adjustable	½	Chain conveyor.....	25–35	7⅜x4½x3	12x6⅞x6¾		Roll	22	16	3	26	½-1
RC-7	Adjustable	½	Chain conveyor.....	25–35	7x4x3	15x6⅞x6¾		Roll	22	16	3	26	½-1
‡Seal on broad panel. §Seal on narrow panel.													
J. L. Ferguson Co., Joliet, Ill.													
Packomatic	Automatic	1	.....	60	.....	11½x6¾x4	Waxed Sulphite..... Waxed Glassine.....	Roll					
Johnson Automatic Sealer Co., Battle Creek, Mich.													
F	Non-adjust.	1	.....	55–70	6x4x1½	11x8x6	Proc. Cellulose.....	Roll	35¾	20	6	18	½-1½
G	Non-adjust.	1	.....	55–70	3x2x1	10x6x5	Plain Glassine.....	Roll	25½	20	6	18	½-1
							Waxed Glassine.....						
H	Non-adjust.	1	.....	55–70	2x1x⅝	5x4x1½	Plain waxed..... Sulphite	Roll	13½	14	3	12	½-1
L	Non-adjust.	1	.....	....	6x4x2	15x12x12	Printed waxed.....	Roll	45	20	6	27	½-2
FF	Adjustable	1	.....	55–70	6x4x1½	11x8x6	Sulphite with elec. eye	Roll	35¾	20	6	18	½-1½
GG	Adjustable	1	.....	55–70	3x2x1	10x6x5	Printed ProcessedCellulose with elec. eye....	Roll	12½	20	6	18	½-1
HH	Adjustable	1	.....	55–100	2x1x⅝	5x4x1½		Roll	13½	14	3	12	½-1
Pneumatic Scale Corp., Ltd., Norfolk Downs, Mass.													
5314	Adjustable	½	Belt conveyor.....	60	3½x2½x1½	9½x6¼x3¾	Waxed paper.....	Roll	5½-13¾	22	5-6	8½-10½	½ in. side ½ in. end

Loose Wrapping Machines—*Continued*

Model	Type	Motor Size H. P.	Package Feed	Packages Per Minute	†Length Min. In.	†Length Max. In.	Width Min. In.	Width Max. In.	Depth Min. In.	Depth Max. In.	Wrapping Materials	Wrapper Feed	Width of Roll or Width of Sheet, Inches	Diam. or Roll, In.	Core, In.	Length of Roll Cut Off or Length of Sheet Inches	Sealing Lap, Inche
Package Machinery Co., Springfield, Mass.																	
AA...	Adjustable Automatic Paper Stop	½	Mag. and belt conv.	110	1 3/16	3¼	1¼	4 3/16	5/16	1 5/16	Glassine: Printed	Roll....	5¼	9[1]	3	2½	9 5/32	⅜ side ½ end
											Waxed	Roll....	5¼		3			
											Paper: Printed	Roll....	...	15[2]	3	2½	9 5/32	⅝ side ½ end
											Waxed	Roll....	5¼		3			
											Processed Cellulose Plain	Roll....	...	8	3	2½	9 5/32	⅝ side ½ end
											Moistureproof	Roll....	5¼		3			
AA-2	Adjustable Automatic Paper Stop	½	Mag. and belt conv.	60	1¼	5 5/8	1¾	5	5/8	2	Glassine: Printed	R. or S.	7¾	10-12	3	4	16	3/8-5/8 side 5/8-¾ end
											Waxed	R. or S.						
											Paper: Printed	R. or S.	7¾					
											Waxed	R. or S.						
											Processed Cellulose: Plain	R. or S.	7¾	8	3	4	16	3/8-5/8 side 5/8-¾ end
											Moistureproof	R. or S.						
AA-4	Adjustable Automatic Paper Stop	½	Mag. and belt conv.	50	1	5 7/8	5½	9⅛	½	2	Glassine: Plain	Roll....	10 5/8	10	3	3 9/16	11¼	5/8 side ¾ end
											Waxed	Roll....	10 5/8	10	3	3 9/16	11¼	5/8 side ¾ end
											Paper: Plain	Roll....	10 5/8	10	3	3 9/16	11¼	5/8 side ¾ end
											Waxed	Roll....	10 5/8	10	3	3 9/16	11¼	5/8 side ¾ end
											Processed Cellulose: Plain	Roll....	10 5/8	8	3	3 9/16	11¼	5/8 side ¾ end
											Moistureproof	Roll	10 5/8	8	3	3 9/16	11¼	5/8 side ¾ end
AG	Not adjust.	½	Slat conveyor.....	65	2¼	5	2 7/16	2 9/16	2 7/16	2 9/16	Waxed Paper	Roll....	7¾	12	3	10 1/16		1-1½ side ½-¾ end
F2	Adjustable Automatic Paper Stop	1	Belt or chain conv.	40 42	2 7/8	15	1½	4½	7/8	3 1/8	Glassine: Plain	R. or S.	5¾ 14 5/8	18	3	6 3/8	14 7/8	7/8 in. side ¾ end
											Waxed	R. or S.	17¼			6	14 7/8	
											Paper: Printed	Sheet...	5¾ 17¼			6	14 7/8	7/8 side ¾ end
											Waxed	Roll....	5¾ 14 5/8	18	3	6 3/8	14 7/8	7/8 side ¾ end
											Backed Foil	Sheet...	5¾ 17¼			6	14 7/8	7/8 side ¾ end
											Processed Cellulose...	Roll....	5¾ 14 5/8	8	3	6 3/8	14 7/8	7/8 side ¾ end
F5	Not adjust. Automatic Paper Stop Elec. Eye	1	Belt or chain conv.	65	2	12 3/8	1 3/16	4 7/16	1 1/16[3] 7/64[4]	3 1/8	Glassine: Plain	Roll....	17	18	3	5 3/8	15.185	7/8-1 bottom ¼-3/8 end[5]
											Waxed	Roll....	17	18	3	5 3/8	15.185	7/8-1 bottom ¼-3/8 end[5]
											Paper Printed	Sheet...	15			5 3/8	15.185	7/8-1 bottom 3/8 end[6]
											Waxed	Roll....	17	8	3	5 3/8	15.185	7/8-1 bottom 3/8 end[6]
											Processed Cellulose...	Roll....	17	8	3	5 3/8	15.185	7/8-1 bottom 3/8 end[6]
F6	Adjustable Automatic Paper Stop Elec. Ey	2	Belt or chain conv.	15-45	4⅛ with seal	13 5/16 heat — 10	3¼	8 9/16 standard 7⅛		1 21/32 5 1/8	Glassine: Plain	Roll....	25	18	3	7¼	20	1⅛ under lap 1¼ end
											Waxed	Roll....	25	18	3	7¼	20	
											Paper: Printed	Roll....	25	18	3	7¼	20	
											Waxed	Roll....	25	18	3	7¼	20	
											Processed Cellulose...	Roll....	25	8	3	7¼	20	
F8	Not adjust.	2	Belt or chain conv.	24	8	15½	4½	9¼	2½	9 5/8	Kraft	Roll....	19 38	18	3	11	22	1½ lap on bottom and in center with or without end seals
											Glassine	Roll....	19 38	18	3	11	22	
											Printed Paper	Sheet....	19 38			11	22	
F9	Adjustable Elec. Eye	1	Belt conveyor.....	70-85	2	12	1¾	5¼	3¼	4 1/8	Glassine: Plain	Roll....	6¾ 18¾	15	3	4¼	16	¾-7/8 End seal may be used
											Waxed	Roll....	6¾ 18¾	15	3	4¼	16	
											Sulphite: Plain	Roll...	6¾ 18¾	15	3	4¼	16	
											Waxed	Roll....	6¾ 18¾	15	3	4¼	16	
											Printed Paper	S. or R.	6¾ 18¾		3			
											Processed Cellulose: Plain	Roll....						
											Moistureproof	Roll....	6¾ 18¾	8	3	4¼	16	
GH	Adjustable Automatic Paper Stop Elec. Eye	¾	Pocket conveyor....	70-95	2½	5 1/8	5/8	3	3/8	1½	Printed glassine Plain	R. or S.	4 8½		3	2 7/8	8½	⅜ width of bar, 1-1¼ underlap on ends. Wax sealed to bottom of bar.
											Printed glassine Waxed one side							
											Printed paper backed foil							
											Processed cellulose: Plain	R. or S.	3¾ 8	8	3	2 7/8	8½	
H.Y.3	Not adjust.	¼	Belt conveyor.....	80-100	2 3/32	1¾	½	1 5/8	¼	¾	Glassine: Waxed	Roll....	1 5/8 ▼ 2 13/16	11	3	3¼	4 7/8	Waxed—heat sealed all laps. Not waxed—End lap seal.
											Plain	Roll....	1 5/8 ▼ 2 13/16	11	3	3¼	4 7/8	
											Waxed paper	Roll....		11	3	2¼	4	
											Printed paper	Sheet...	1 1 1/16 2¼			2 13/16	3 13/16	
O4	Adjustable Elec. Eye	½	Mag. or belt conv.	65-70	2 3/8	9	2½	4½	1 1/16	2	Waxed paper	Roll....	4¾ 11¾	14	3	8	14	1 in. bottom, 1 in. end seal.

[1] Magazine feed. [2] Belt feed. [3] End seals. [4] Heat seal. [5] With or without seals [6] No seals.
*Edge to edge measurements. †Although these machines will handle packages within these limits, no package should have the three minimum nor the three maximum dimensions.

with end-seals, the end laps are made narrower than they otherwise would be and an allowance is made for a margin which will give a perspective to emphasize the design or trademark on the seal.

In case of cartons having square ends, an end-seal effect is sometimes obtained with printed wrappers by having the wrapping machine equipped with knives which slit the extension of the top panel after the wrapper is formed around the package. These slits are made about 3/16 in. in from the sides of the carton to insure a lapover and a full seal at the corners when the slit-out portion of the top panel is sealed over the ends. The design on the slit-out portion of the wrapper should be enough smaller—approximately ½ in.—than the end of the carton to prevent being cut by the knives on the machine. In the case of waxed-paper wrappers, double-pointed end laps are quite generally made. With other wrapping materials, the

(Turn to page 120A)

Low-Step Trucks of Many Models

Complete Specifications of All Models Offered Together With Diagrams of Operating Controls

Directory of Makers of House-to-House Trucks

Truck	Company	Address
DiVco	Continental-DiVco Co.	Detroit, Mich.
Edwards	Edwards Iron Works, Inc.	South Bend, Ind.
Federal	Federal Motor Truck Co.	Detroit, Mich.
Ford	Ford Motor Co.	Dearborn, Mich.
Indiana	White Co.	Cleveland, Ohio
International	International Harvester Co.	Chicago, Ill.
Pak-Age-Car	Stutz Motor Car Co. of America, Inc.	Indianapolis, Ind.
Reo	Reo Motor Car Co.	Lansing, Mich.
Step-Go	De Kalb Wagon Co.	De Kalb, Ill.
Twin Coach	Twin Coach Corp.	Kent, Ohio
Walker	Walker Vehicle Co.	Chicago, Ill.
Ward	Ward Motor Vehicle Co.	Mt. Vernon, N. Y.
White	White Co.	Cleveland, Ohio

ON THIS and the following pages, readers of FOOD INDUSTRIES will find the first exclusive specifications and summaries of house-to-house delivery trucks ever published. These special-purpose vehicles, while adaptable to house-to-house deliveries of many different products, are especially valuable to those companies in the food industries which deliver dairy and bakery products. The specifications and other data given herewith form a reliable buyers' guide for 1933 for such vehicles by those executives who are responsible for the selection and purchase of auto-

Line Number	Make and Model	Price, $, Including Standard Body	Wheelbase, Inches	Capacity: Tons	Capacity: Cases of Milk, Qts.	Capacity: Bakery, Cubic Feet	Length, Overall, Inches	Width, Overall, Inches	Weights: Ready to Work, Lbs.	Weights: Gross Allowable, Lbs.	Tire Sizes: Front	Tire Sizes: Rear	Major Units: Engine and Details: Make and Model	No. of Cylinders, Bore and Stroke	N.A.C.C. Rating	Brake HP. at Given Revolutions	Fuel Consumption at Idling, Qts. per Hour	Lubrication	Governor	Oil Filter	Air Cleaner	Fuel Feed	Fuel Tank Location	Clutch: Type	Clutch: Diameter, Inches	Gearset: Type	Gearset: Location	Gearset: No. Forward Speeds	Rear Axle Drive
1	DiVco, H	1295	96	1½	48	150.5	159¾	69	4188	7200	6.00/20	32x6s	Cont, H8	4-3⅜x4½	18.2	32.7@2500	0.70	FF	Y	Y	Y	V	R	SP	10	S	U	3	B
2	DiVco, M	1395	109	1½	48	150.5	176½	70½	4430	7500	6.00/20	32x6s	Cont, H8	4-3⅜x4½	18.2	32.7@2500	0.70	FF	Y	Y	Y	V	R	SP	10	S	U	4	B
3	DiVco, K	1595	109	1½	48	150.5	176½	70½	4530	7600	6.00/20	32x6s	Cont, 25A	6-3⅜x4	27.3	52.5@2000	1.10	FF	Y	Y	Y	P	R	SP	10	S	U	3	B
4	Edwards Monotrol, A	1311	130	1½	56	130.0	191¼	72	4370	8000	6.00/20	32x6s	Stud, 1½T	6-3¼x4⅝	25.4	75.0@3200	.....	FF	....	....	....	....	....	SP	..	S	U	4	B
5	Federal, DM	1275	108	1	42	133.0	168	68	4650	8000	6.00/20	32x6s	Cont, W10	4-3⅞x4¼	24.0	50.0@2700	1.06	FF	Y	Y	Y	P	R	SP	11	S	U	4	B
6	Federal, DM	1325	120	1½	56	160.0	174¼	68	4650	8000	6.00/20	32x6s	Cont, W10	4-3⅞x4¼	24.0	50.0@2700	1.06	FF	Y	Y	Y	P	R	SP	11	S	U	4	B
7	Ford, AA, Standrive	995	112	1½	42	.....	168¼	69	4100	6620	6.00/20	32x6s*	Own, AA	4-3⅞x4¼	24.0	40.0@2200	.....	FF	N	N	N	G	D	SP	9	S	U	4	B
8	Indiana, 70	1425	112	1½	42	150.0	177⅛	67¾	5000	8500	7.00/20	7.00/20s	Her, OOB	4-3¾x4¼	22.5	37.5@2000	N.Giv	FF	O	N	Y	P	R	SP	12	S	U	3	B
9	Indiana, 70	1525	112	1½	42	150.0	177⅛	67¾	5000	8500	7.00/20	7.00/20s	Her, JXA	6-3⅜x4¼	27.3	59.0@2800	N.Giv	FF	O	N	Y	P	R	SP	12	S	U	3	B
10	International, M2	1250	118	1½	42	112.7	181½	71⅛	4480	7000	6.50/20	6.50/20s	Wau, XAH	4-3⅝x4½	21.0	39.0@2400	.....	FF	N	N	Y	V	R	MD	9	S	U	4	B
11	Pak-Age-Car	995	90	1	52	126.5	136¼	60¾	2000	3000	6.50/17	6.50/17s	Austin	4-2.2x3	7.7	13.0@3400	0.50	FF	N	N	N	G	R	SP	9	S	U	3	B
12	Reo, Spl. Dlvy	1395	120	1½	42	240.0	188	71	5100	8000	6.00/20	32x6s	Own, H205	4-3 1/8x4½	23.3	51.0@2500	1.40	FF	Y	N	N	P	R	SP	10	S	U	3	B
13	Step-Go, B200	1135	113	1½	42	130.0	168	69	4050	7050	6.00/20	32x6s	Dodge	6-3⅛x4⅜	23.5	62.0@3100	.....	FF	N	Y	Y	P	B	SP	10	S	U	4	B
14	Step-Go, B300	1195	113	1½	42	130.0	168	69	4050	7050	6.00/20	32x6s	Dodge	6-3⅛x4⅜	23.5	62.0@3100	.....	FF	N	Y	Y	P	B	SP	10	S	U	4	B
15	Step-Go, B400	1195	113	1½	62	165.0	188	69	4250	7250	6.00/20	32x6s	Dodge	6-3⅛x4⅜	23.5	62.0@3100	.....	FF	N	Y	Y	P	B	SP	10	S	U	4	B
16	Step-Go, B500	1255	113	1½	62	165.0	188	69	4250	7250	6.00/20	32x6s	Dodge	6-3⅛x4⅜	23.5	62.0@3100	.....	FF	N	Y	Y	P	B	SP	10	S	U	4	B
27	Twin Coach, 76	1350	76	1	30	300.0	152	66	3950	5950	7.00/18	7.00/18s	Her, IXA	4-3 x4	14.4	29.0@2200	0.49	FF	Y	Y	Y	P	R	SP*	12	S	U	4	B
28	Twin Coach, 96	1450	96	1½	45	350.0	172	66	4350	7350	7.00/18	7.00/18s	Her, OOB	4-3¾x4½	22.5	37.5@2200	0.72	FF	Y	Y	Y	P	R	SP*	12	S	U	3	B
19	Twin Coach, 132	2000	132	2	100	500.0	208	71	5000	9000	7.50/18	7.50/18s*	Her, JXC	6-3¾x4¼	33.7	59.0@2000	.....	FF	Y	Y	Y	P	R	SP*	12	S	U	3	B
20	Ward, BD	.....	91	1½	*36	.....	148*	72	....	8500	32x6	32x6s	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	N	..	.....	.....	4	B
21	Walker, 100-101	1690*	85	1½	36	160.0	136	69	6000	8000	32x6	32x6s	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	N	..	.....	.....	4	B*
22	White, 60K	2375	112	1½	42	150.0	178	68	5400	8500	7.00/20	7.00/20s	Own, 1A	6-3½x4½	29.4	54.0@2000	N.Giv	FF	Y	Y	Y	V	R	SP	13	S	U	3	B

KEY TO ABBREVIATIONS (Arranged Alphabetically)

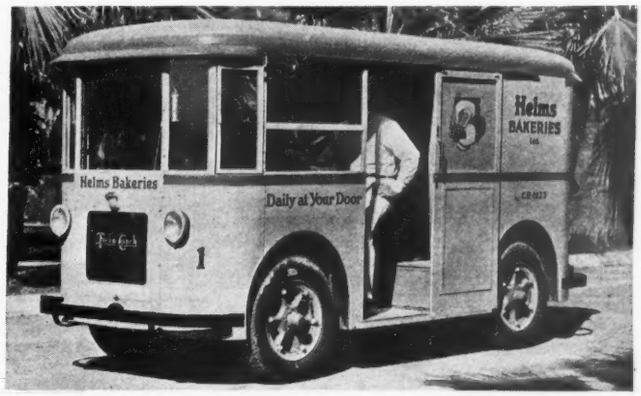
Am—Amidship motor location, Ward
B—In body, fuel tank location
B—Bevel, rear axle drive
Ca—Cantilever rear spring on Ford
Con—Contactor type of controller
Cont—Continental
D—Fuel tank in dash
FF—Force feed engine lubrication
G—Gravity fuel feed
GS—Galvanized steel
H4—Hydraulic brakes on 4 wheels
Her—Hercules
M2—Mechanical brakes on 2 wheels
M4—Mechanical brakes on 4 wheels
MD—Multiple disk clutch
MW—Steel superstructure with Met-L-Wood panels
N—No or none
N.Giv—Not given
O—Optional
P—Pump, fuel feed
P—Panel, body type
Price*—Walker price without battery. With battery, K.W.—$2,129; with Exide Ironclad, $2,340; with Edison, $2,800.
PS—Propeller shaft brake

for House-to-House Delivery Service

motive equipment. While practically all other types of passenger cars, trucks, tractors and trailers are employed in great numbers by companies in the food industries, dairies and bakeries find the house-to-house delivery truck a most important part of their fleets.

The theory of design on which the house-to-house vehicles have been developed has been to produce a truck from which deliveries could be made with the least effort on the part of the driver. This fundamental characteristic of the house-to-house truck which differentiates it from conventional com-

One of the three models of the DIVco line, a Model M, four-cylinder unit used in milk delivery.

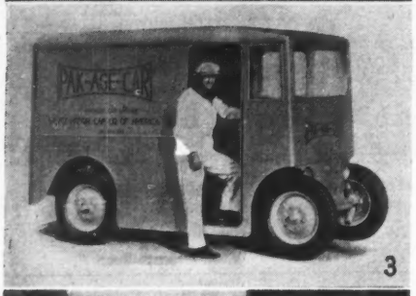


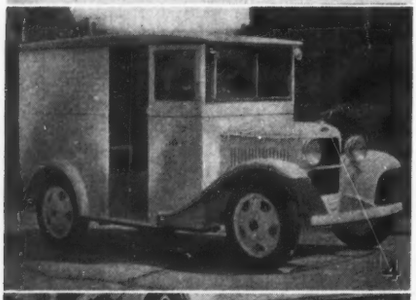
A Twin Coach, one of three models, used in house-to-house delivery of bakery products.

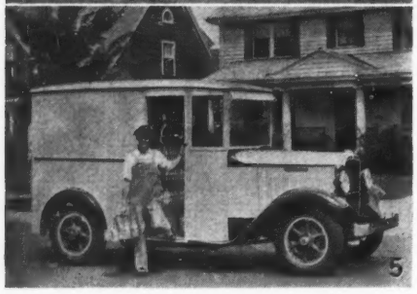
For Electric Trucks							Controls									Brakes		Springs		Body Details																	
Battery								Other Controls										Front	Rear				Side Doors					Standing Well									
Location			Ampere-Hr. Capacity	Motor Location	Controller, Type	Is Standard Control (Separate Clutch and Brake) Provided?	Pedal	Lever	Sets Brake and Disengages Clutch	Idles Engine	Separate Brake Pedal	Foot Accelerator	Hand Accelerator	Free Wheeling	Service, Type, Location	Emergency, Location	Type, Length and Width	Type, Length and Width	Type	Material	Rear Doors	Type			Location		Clear Width	Clear Height	Length	Step to Ground	Dome Light	Inside Lining	Floor Lining	Type	Location	No. Forward Speeds	Rear Axle Drive	Number
Front	Rear	Sides																				Single Folding	Double Folding	Sliding	Inside	Outside											
						No	Y	N	Y	N	N	Y	Y	N	M4	W4	SE-38 x2¼	SE-43¾x2¼	P	W	Y	N	N	Y	Y	N	24	72	24	15⅜	Y	GS	GS	U	3	B	4	
						No	Y	N	Y	N	N	Y	Y	N	M4	W4	SE-38 x2¼	SE-44¾x2¼	P	W	Y	N	N	Y	Y	N	24	74	24	14¾	Y	GS	GS	U	3	B	5	
						No	Y	N	Y	N	N	Y	Y	N	M4	W4	SE-38 x2¼	SE-44¾x2¼	P	W	Y	N	N	Y	Y	N	24	74	24	14¾	Y	GS	GS					
						No	N	Y	Y	Y	N	N	Y	Y	M4	W4	SE-36 x1¾	SE-45 x2½	P	St	O	N	N	N	Y	N	22½	76½	27½	16	Y	MW	GS	U	4	B	4	
						Yes	Y	N	Y	Y	Y*	Y	N	N	H4	PS	SE-38½x2¼	SE-50 x2½	P	W	N	N	N	Y	Y	N	24	73¾	24	13½	Y	GS	GS	U	4	B	5	
						Yes	Y	N	Y	Y	Y*	Y	N	N	H4	PS	SE-38½x2¼	SE-50 x2½	P	W	N	N	N	Y	Y	N	24	73¾	24	13½	Y	GS	GS					
						Yes	Y	N	Y	N	Y	N	Y	N	M4	PS	Tr-33x2¼	Ca-36x2½	P	W	N	N	N	Y	Y	N	25¼	73¾	21½	15½	Y	GS	GS	U	4	B	7	
						Yes	Y	Y	N	Y	Y	Y	Y	N	M4	W4	SE-40 x2½	SE-50 x2½	P	W	R	N	N	Y	Y	N	26½	74⅛	27½	16	Y	N	GS	U	3	B	8	
						Yes	Y	Y	N	Y	Y	Y	Y	N	M4	W4	SE-40 x2½	SE-50 x2½	P	W	R	N	N	Y	Y	N	26½	74⅛	27½	16	Y	N	GS					
						Yes	Y	N	N	Y	Y	Y	Y	Y	M4	PS	SE-40 x2	SE-46 x2½	P	W	Y	N	Y	N	N	Y	25 3/16	70 5/16	25 3/16	14⅞	Y	PW	GS	U	4	B	9	
						No	N	Y	Y	N	Y	N	Y	N	M2	W2	Special	Tr-43½x3	P	St	N	N	Y	N	Y	N	60	74½	52	10¼	Y	GS	GS	U	3	B	10	
						Yes	Y	N	Y	Y	Y	Y	Y	N	H4	PS	SE-40 x2	SE-50 x2½	P	St	Y	N	N	Y	N	Y	25	74	121¼	15¾	Y	GS	GS	U	3	B	11	
						No	Y	N	Y	N	N	Y	N	N	H4	PS	SE-36 x1¾	SE-48 x2¼	P	W	Y	N	N	Y	Y	N	23	73	25½	14½	Y	GS	GS	U	4	B	12	
						No	Y	N	Y	N	N	Y	N	N	H4	PS	SE-36 x1¾	SE-48 x2¼	P	W	Y	N	N	Y	Y	N	23	73	25½	14½	Y	GS	GS	U	4	B	13	
						No	Y	N	Y	N	N	Y	N	N	H4	PS	SE-36 x1¾	SE-48 x2¼	P	W	Y	N	N	Y	Y	N	23	73	25½	14½	Y	GS	GS	U	4	B	14	
						No	Y	N	Y	N	N	Y	N	N	H4	PS	SE-36 x1¾	SE-48 x2¼	P	W	Y	N	N	Y	Y	N	23	73	25½	14½	Y	GS	GS	U	4	B	15	
						Yes	Y	Y	Y	N	Y	Y	N	N	H4	PS	SE-42 x2	SE-42 x2	P	St*	Y	N	N	Y	N	Y	29	74	34	12	Y	N	N	U	3	B	16	
						Yes	Y	Y	Y	N	Y	Y	N	N	H4	PS	SE-42 x2	SE-42 x2	P	St*	Y	N	N	Y	N	Y	29	74	50	12	Y	N	N	U	3	B	17	
						Yes	Y	Y	Y	N	Y	Y	N	N	H4	PS	SE-42 x2½	SE-42 x2½	P	St*	Y	N	N	Y	N	Y	29	74	86	12	Y	N	N					
Y	Y	Y	....	Am	Con	No	N	Y	.....	.....	Y	.....	.....	.....	H4	PS	SE-34 x2	SE-44 x2½	.....	.....	.....	.....	T	O	....	O	RD	ER	.....	.....	.....	.....	.....	.....	4	S*	18
Y	Y	N	238	RA	Con	No	N	Y	.....	.....	Y	.....	.....	.....	M4	W2	SE-34 x2	SE-46 x2½	P	W*	O	N	N	Y	O	O	50	75	23	17¼	Y	N	N	U	3	B	19
						No	Y	Y	N	Y	Y*	Y	Y	N	H4	PS	SE-39 x2¼	SE-50 x2½	P	W	Y	N	N	Y	Y	N	25	74⅛	27½	16	Y	GS	GS					

KEY TO ABBREVIATIONS (Arranged Alphabetically)

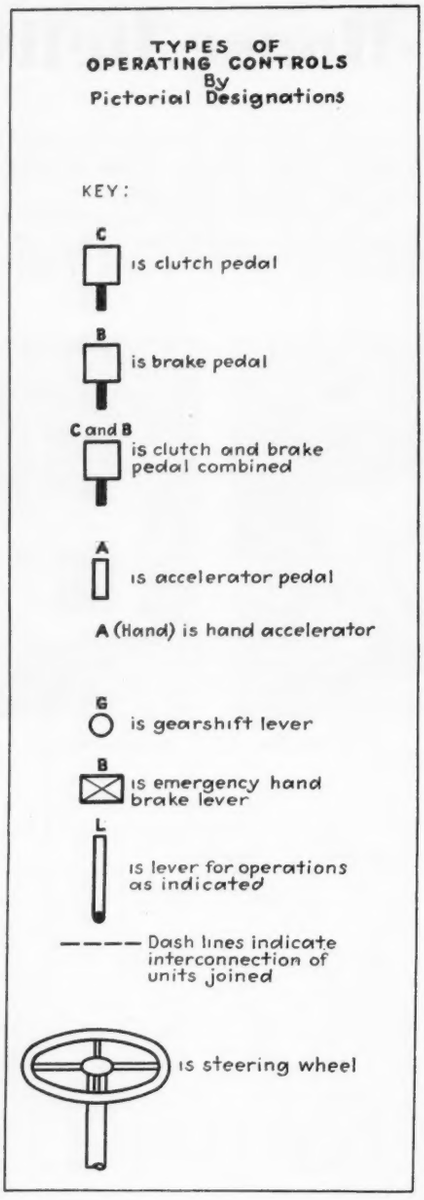
PW—Plywood
R—Rear, fuel tank location
RA—Rear axle motor location
s—single tires
s*—8.25/18 optional, extra cost on Twin Coach
s*—6.00/20 dual, optional on Ford
S—Sliding gear type of gearset
S*—Spur gear rear axle drive
SE—Semi-elliptic springs
SP—Single-plate clutch
SP*—Automatic clutch optional
St—Steel body construction
St—Aluminum alloy body panels optional on Twin Coaches
Stud—Studebaker
Tr—Transverse spring
U—Unit with engine
V—Vacuum fuel feed
W2—Emergency brakes on 2 wheels
W4—Emergency brakes on 4 wheels
W—Wood body construction
W*—Aluminum panels optional
Wau—Waukesha
Y—Yes
Y*—Separate clutch pedal

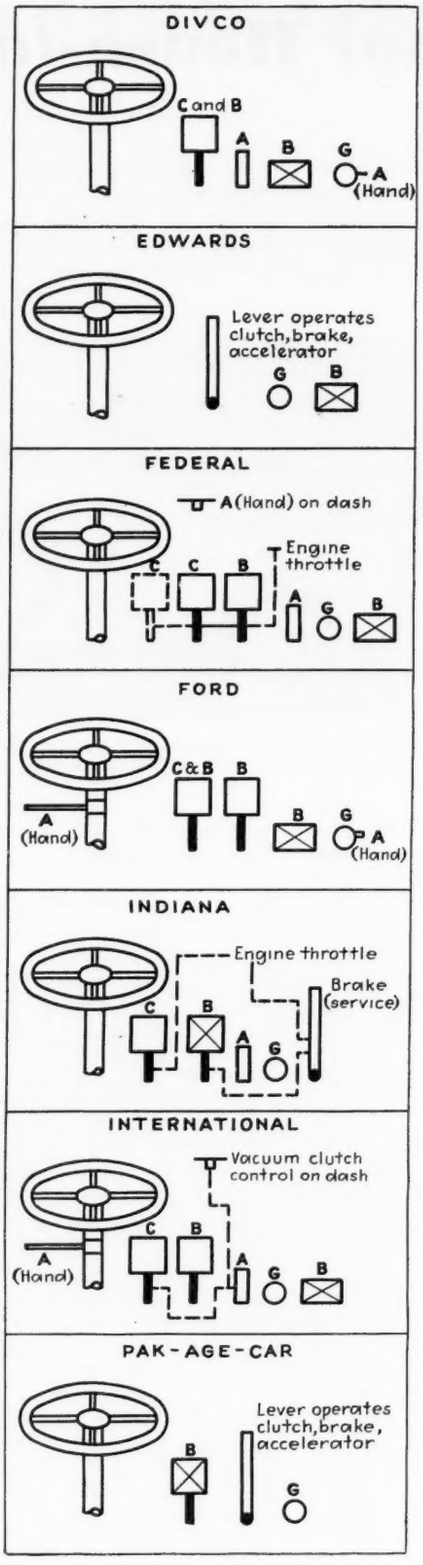






1. Walker low-step electric used in store-to-store bakery deliveries. 2. Ward Model BD, drop-frame electric assembled from standard units. The truck shown is used on a retail milk route. Note interior case racks. 3. Pak-Age-Car, unique in design, with the complete power plant and rear wheels removable. It is designed to better the unit delivery costs of the single horse wagon. 4. Step-Go, made by the DeKalb Wagon Co. on Dodge chassis. 5. Edwards Monotrol on Studebaker chassis. The Edwards unit has a single lever control and employs the Bendix automatic clutch control and the Bendix BK booster brake.

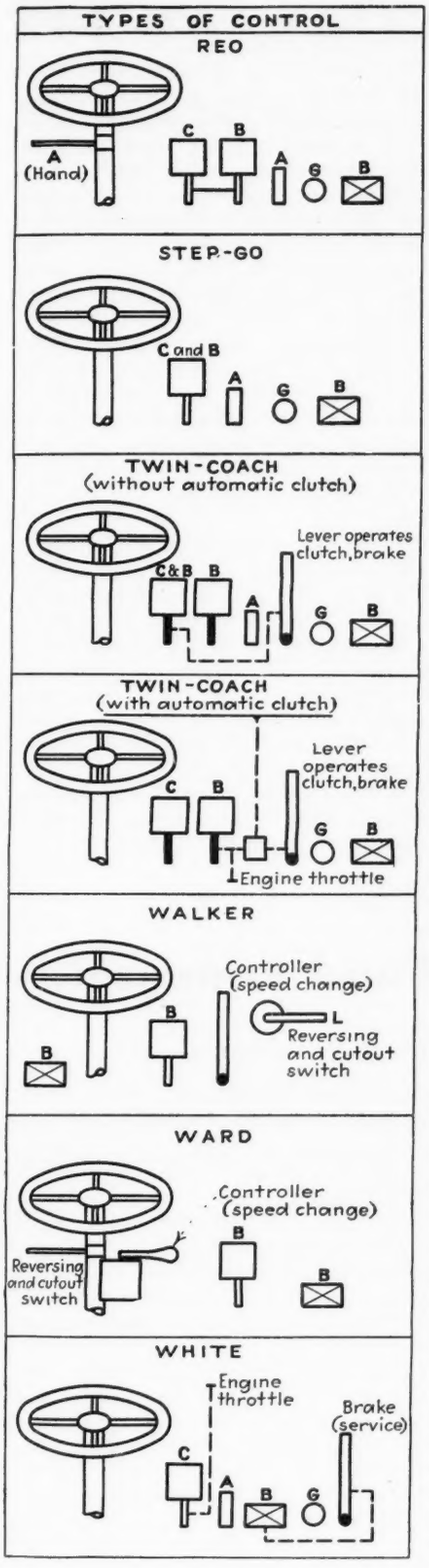




mercial vehicles first expressed itself in a low driving platform which the driver could leave or enter by a single step from street or sidewalk. This feature of design was for the purpose of reducing the fatigue of the driver—an important factor because of the great number of delivery stops following each other in rapid succession.

In city deliveries, where stops are made in adjacent houses, 50 to 200-300 ft. or more apart, the continuous physical work of the driver is great as compared with the route where the stops are ½ mile or more apart. In the latter work the driver virtually has rest periods between stops. These rest periods do not exist in house-to-house work and hence the low platform to conserve the driver's strength.

The next aim of the house-to-house truck designer was to reduce the physical effort of the driver in manipulating the brake, clutch, gearshift and brake controls of gasoline trucks—in that order—for each stop. The close succession of stops made it apparent that the driver could obtain no worth-while relaxation by sitting on a regular seat. He would hardly be seated before he would have to get up again to make the next delivery. This led to the design.



of controls so that the vehicle could be operated by the driver in a standing position.

That made necessary one fundamental change in the conventional pedal controls. It was evident that the driver could not stand and operate both the usual clutch and brake pedals simultaneously. When pedals are used as part of the driver's control, the design must be such as to require the use of only one pedal at a time. Some designers have used a combination clutch and brake pedal. Others have used pedals and hand levers in combination. Still others have used a single lever to control clutch, brake and accelerator. How well the ingenuity of the American automobile designer has been applied to produce simplified, easy controls is well illustrated in the sketches of the different types on this and the opposite page.

Load Must Be Accessible

Along with the development of the low platform, the standing driver's position and the simplified controls came the necessity of so designing the vehicle body that the load is easy to reach at all times. All these features have enabled the driver to perform his duties with the minimum of physical effort. This in turn has resulted in more work being done in a given time and a consequent reduction in the cost of unit deliveries.

In the use of house-to-house gasoline trucks on routes close to the home station, the engine is idling for the principal part of the day. Hence its design must be such as to afford fuel economy at idling speeds. Maximum road speed is not such an important factor, as the only regulation driving is to and from the route. However, as the routes spread out, road speeds become of more importance to get to and from the routes quickly. The necessity for fuel economy at engine idling speeds on the delivery portion of the routes still exists. Some of the makes of trucks described herewith have met these conditions by the use of four-cylinder engines for close-in routes and by larger six-cylinder engines for more distant routes or hilly territory where greater power is required. Types of automatic engine throttling devices also have been developed to afford greater fuel economy than is possible through manual operation.

Competition With the Horse

Turning now from the structural design of the house-to-house truck to its use, the different makes offered may be divided into two classifications. First are those capable of doing more work than the horse wagon and, second, those designed to compete directly and solely with the single horse-drawn wagon. All of the models listed except one come in the first class. The sole entry to the second class is the Pak-Age-Car, in which an attempt has been made to reproduce the general set-up and initial cost of the single horse wagon and to be more economical in operation and maintenance.

In the first classification, the models on the market may be divided into two

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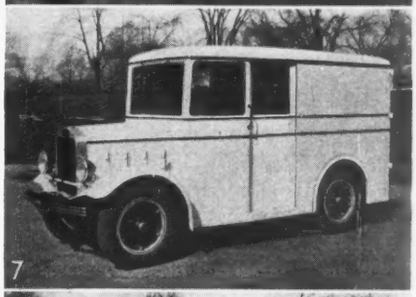
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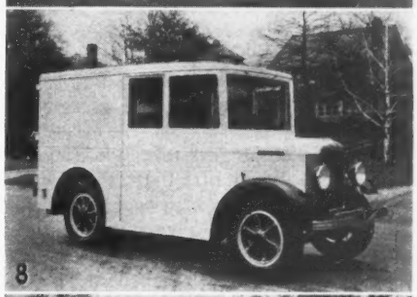
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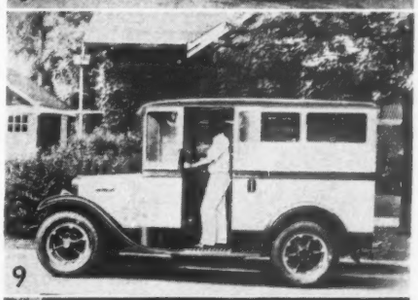
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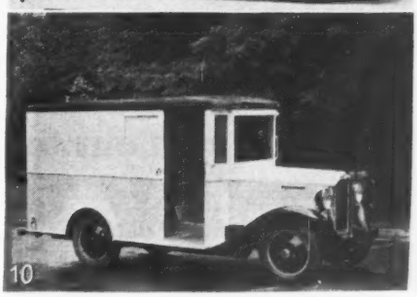
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6. One of the two Federal dropped-frame models designed especially for house-to-house deliveries. 7. White 60K, a sturdy, six-cylinder unit with reserve power for the most difficult of house-to-house milk or bakery routes. 8. One of the two Indiana models, also marketed by the White Co.; it is assembled from standard units and comes with four- and six-cylinder engines. 9. International Model M2. Note body design, good driver vision and type of outside folding doors. 10. Reo house-to-house model with special low-platform floor; simplified driver controls and body with outside sliding doors and interior case racks.

▼

types of gasoline and electric trucks. Each type has its advantages. In practice, these varying advantages may be most fully utilized by a close study of all the operating conditions surrounding the use of the vehicles.

All of the vehicles in both classifiations of use as defined previously are for the purpose of providing lower unit costs of delivery than the horse wagon. In some cases the motor vehicles render a service which it is impossible for the horse-drawn wagon to provide.

In the dairy industry, and particularly in the retail delivery of milk, where the use of the house-to-house truck has become more firmly established and is used in greater numbers than in house-to-house bakery deliveries, it is generally accepted that all types of motor vehicles will give a lower unit delivery cost than a two-horse or team route wagon. On some routes, motor vehicles must be used on account of the mileage which has to be covered. Here, however, the agreement ceases.

Some of the largest retail milk companies still maintain that the horse wagon has its place. These concerns assert that there is a certain delivery area, roughly represented by routes from 2 to 15 miles in length, in which the unit cost of delivery by horse wagon is cheaper than by any type of motor vehicles. And, what is more important, these same companies back up their

A Ford AA, Standrive truck, used for milk delivery with a capacity of 42 cases.

claims by using horse wagons in that delivery area.

The Pak-Age-Car, which has only recently been introduced in its present form, has been definitely designed to accept that challenge. It is intended to compete solely with the single horse wagon and not with other gasoline or electric trucks. In the horse zone it is designed to be more economical in operation and maintenance than the horse wagon and to give a lower net cost of delivery. Continued interest of the industry in the vehicle will determine the answer as to its ability to better the present horse costs and give a lower unit delivery cost.

The same milk operators who contend that the horse is cheaper in its particular zone state that the other types of house-to-house trucks cost so much more to buy and to operate and maintain that they cannot give a lower unit delivery cost in that zone. The evident answer to that contention is that some way must be found for these more costly vehicles to perform more work.

When that is accomplished the unit cost of delivery will be reduced. The solution of this problem rests more with the operator than with the vehicle maker. As has been stated in these pages previously, one of the easiest approaches to the solution of this problem is putting more than one man on the truck.

Competent transportation engineers who have studied the problem declare that it is only a matter of time until its solution will be found and the death knell sounded for the horse in his last stronghold. No matter whether the solution comes through the direct substitution of a truck for a horse wagon, each doing the same work, or by trucks doing twice the work, it is probable that the vehicles selected will be developed from among those described and illustrated on these pages.

Operating Motor Trucks in the Food Industries

• This regular department, reduced in length to make room for the preceding important feature article telling about house-to-house delivery trucks, will be at its full two-page length in our April issue. Watch for timely data on motor-truck costs; future developments anticipated in refrigerated bodies for use in the food industries; fuel saving by exhaust-gas analyzers; and the paper ice cream can.

Proper Tire Controls Save Money

BECAUSE tire costs, next to fuel costs, are the most important item of truck operating expenses, it is necessary that some adequate control be set up to keep these costs in line. Too often large truck operators in the food industries expend great efforts to obtain the lowest possible initial price and the highest possible mileage adjustment basis, and assume that a low net-tire-cost-per-mile will naturally result. This, however, will not be the case unless proper subsequent controls are provided. With such controls, tire bills may be reduced 10 per cent or more.

The controls recommended may be divided into two main classifications. The first is a maintenance control to select the proper size of tire and to provide for repairs and the maintenance of proper inflation pressures. The second classification is a paper-work control to keep a record of each individual tire from the time it is delivered until it is discarded as unfit for further service.

Care of Tires Is Important

Reduced tire expense under the first control is obtained only by eternal vigilance and attention to the small details of repairs to cuts and bruises; tight anti-skid chains; air pressure gages for tire inflation; proper wheel and axle alignment; proper tire mounting; and the like.

When a tire has been worn so that it is unfit for further use, the proper record control should give a complete history of the tire. If this history shows that the tire has delivered more than the guaranteed or adjustment-basis mileage, it may be discarded. The mileage run beyond the guaranteed mileage will serve to reduce the cost per tire-mile obtained by dividing the initial price by the guaranteed mileage.

If, however, the tire has not delivered the guaranteed mileage, it should not be discarded at once. Instead, it should be held as evidence until such time as the tire supplier has allowed a credit on a new tire to an amount equivalent to the value of the undelivered mileage. The actual worn-out tire enables the tire supplier to determine if the reduced mileage of the tire has been due to abuses. It also serves as a good check on the care given by the operating personnel.

YOU CAN MAKE A MACHINE

That Will Open Paper Sacks

By **BILLIE BURGAN**
San Diego, Calif.

Four compressed-air sack openers at the Chily Bear plant of Hage's, Ltd. These "home-made" machines tripled sacking speed. They can be built in four to six hours.

SOON after Chily Bears were introduced by Hage's, Ltd., at San Diego, Calif., the demand ran into hundreds of dozens daily. Now, no one could kick about that. But it so happened that the Chily Bears—which are sweetened frozen milk in paper cups—had to be put into paper sacks along with wooden spoons and coupons. It was slow work, and it took four girls more than eight hours to sack 400 dozen.

With the idea of finding a way to speed up packaging, tests were made to see if the sacks could be opened by compressed air. At first these were unsuccessful, but finally the correct position for the air nozzle—4 to 5 in. from the sack—and the proper air pressure—about 5 lb. per square inch—were discovered. The next step was to devise a mechanism that would employ the discoveries in a practical way. This was done, and the result is a machine that tripled sacking speed.

This sack opener has a steel finger that clasps five to eight dozen sacks against the body of the unit, the sacks being held by their long side, with the other side free. The finger is attached to a spring and slides through a bushing so that it may be pulled out to insert the sacks. An air nozzle is rigidly attached to the finger and it always remains in the correct position relative to the sack to be opened. The machine works rapidly, for as soon as one sack is slipped from under the finger the next one is blown open.

This machine is so simple that it can be built by almost anyone. Here's how it's done: Take the materials listed in the Bill of Materials, shape and drill the parts as indicated in Fig. 1 and Fig. 2 and assemble them as shown in Fig. 3.

Form the body *A* by shaping as indicated. Then fasten bushing *K* in top center hole of back with the two flat ring nuts *L*. Fasten the base to block *B* with wood screws. Attach guide *C* to back with stove bolts. Bolt panel wood *D* to inner side of back. Bolt block *E* to spring *H* and attach assembly to back. Attach clasp finger *F* and air nozzle *I* together, by brazing, to form *J*. Insert the finger shank through bushing *K*. Drop guide screw *P* through slot in guide *C* and screw it into threaded hole in the shank; it will hold the nozzle upright and keep the finger down. Connect spring *H* and the finger shank with link *G*. Then join the air supply *O* to the machine with rubber tubing *M*.

The opener made according to the dimensions given in the charts will handle sacks 3½ in. wide by 8⅛ in. tall on the long side and 7¾ in. tall on the short side. Shorter sacks can be handled by using a spacing block to elevate them. Dimensions should be increased proportionately for larger sacks.

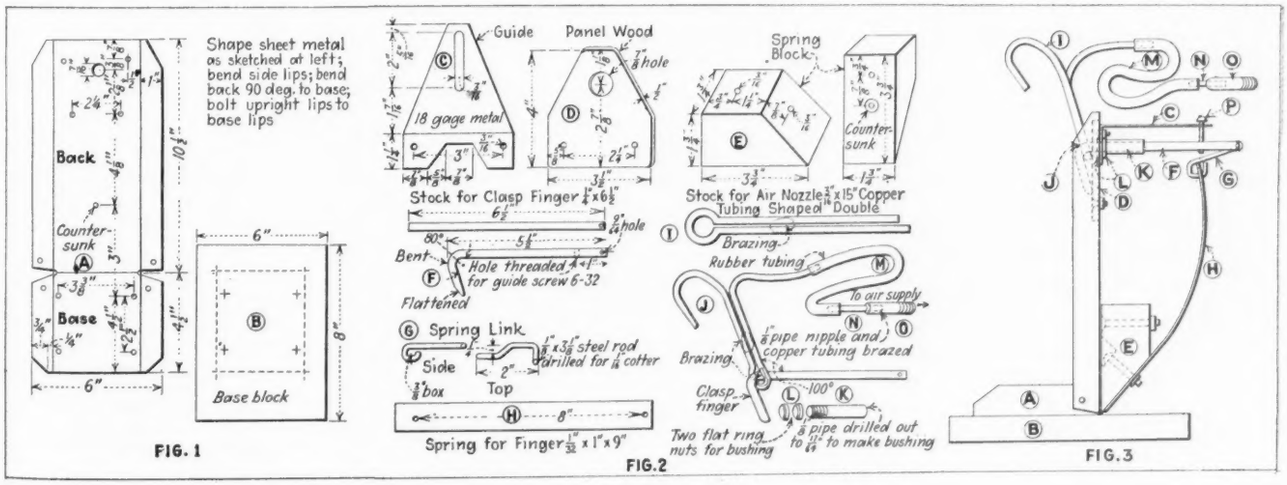
An experienced machine-shop man will make these machines in four to six hours each. The resultant reduction of production expense is big compensation for the trouble.

BILL OF MATERIALS

Part No. Material

A. One piece of 18-gage sheet metal, 6x15 in.
B. One hardwood block, 6x8x¾ in.
C. One piece of 18-gage metal, 3⅞x5 in.
D. One piece of panel wood, 3½x4x½ in.
E. One wooden block 3¾x1¾x3¾ in.
F. One piece of cold-rolled steel, ¼ in. in diameter and 6½ in. long.
G. One steel rod, ⅛ in. in diameter and 3½ in. long.
H. One flat spring, 1/32x1x9 in.
I. One piece of copper tubing, 7/16 in. in diameter and 15 in. long.
K. One piece of ¼-in. pipe, 1⅞ in. long.
L. Two flat ring nuts made from ¾-in. pipe coupling.
M. One piece of rubber tubing similar to windshield-wiper tubing.
N. One piece of copper tubing, 7/16 in. in diameter and about 1½ in. long.
O. One pipe nipple, ⅛ in. in diameter and 1½ in. long.
P. One machine guide screw, 6-32, 1-in. long.

Fig. 1—Detailed layout for base. **Fig. 2—Detailed layout for working parts.** **Fig. 3—Assembled sack opener.**



Will New Philosophy Change Food Transportation Costs?

FREIGHT RATES must be changed to meet general changes in economic conditions. So argues a powerful group representing agriculture, coal mining and lumber. They urge that the Interstate Commerce Commission must reduce freight rates on their types of raw materials in substantial measure, in order that freight may bear a reasonable and normal relationship to the total cost of the goods when delivered.

Freight is a big factor in food cost, both the payment for hauling raw material and the payment for transportation of factory products. No other division of industry has been as regularly a patron of transportation agencies during the present depression as have those offering for haulage animals, grains, other food raw materials, and the food factory output. But even if the food industries are nearly depression proof as to quantity of goods hauled, this does not mean that haulage rates can stay up regardless of business conditions. This, in its essence, is the philosophy now proposed by industry.

Every division of the food industries must give serious thought to this idea. Each should weigh it with respect to his own kind of goods and his own individual company problems. More than half of the total revenue freight of the nation is involved. If that half gets a lower freight rate on raw materials, will the factory be expected to make up railroad deficits with higher payments on their finished goods? The raw material producers carefully say "no." They argue that lower freight rates will soon aid in stimulating business, and that the gross revenue of the carriers will not in fact decline. That argument is easily made but not easily proved. In fact, no real proof of it is possible; only a forecast.

Secondary problems, of technologic as well as economic importance, at once arise. If rail rates are adjusted according to business conditions, then what of truck transportation? If rates on raw materials are to be lowered, what of the milling-in-transit rates? If the differential between raw-material rates and rates on finished goods is to change, what of factory location? Must we relocate many of our present establishments? And with a changed rate, and consequent changed price relationships, what of the relative importance in the future of greater percentage recoveries of finished product from a unit of raw material? May not changed cost relations actually necessitate changed interpretation of technologic advance? And finally, will freight-rate changes not also change the relative unit value of labor, as it certainly will change the relative importance of the cost of capital?

Food Industries Contribute 13 Per Cent of Rail Freight and 24 Per Cent of Freight Revenue

Classification of Shipments	Tons, Millions	Per Cent of Total	Revenue, Millions of Dollars	Per Cent of Total	Revenue Per Ton
Food Raw Materials	81.6	9.1	574.4	17.1	$7.04
Mfd. Raw Materials	40.6	4.6	255.8	7.6	6.30
Other Agricultural Materials	7.0	0.8	50.0	1.5	7.14
Other Animal Products	3.1	0.3	28.8	0.9	9.29
Other Mfd. Products	194.0	21.7	995.3	29.6	5.13
Products of Forests	43.0	4.8	168.6	5.0	3.92
Products of Mines	502.0	56.2	946.0	28.2	1.88
Less-Than-Car Load Freight	22.7	2.5	340.1	10.1	14.98
Total	894.0	100.0	3,359.0	100.0	.....

Freight Originated by Food Industries

Classified according to type of raw material or class of factory product for latest available report (1931)

	Tons (Thousands)	Per Cent of Total	Revenue Millions of Dollars	Per Cent of Total	Revenue per Ton
Food Raw Materials					
Wheat	26,228	32.1	100.1	17.4	$3.84
Feed Grains	16,787	20.5	59.9	10.4	3.57
Rice	831	1.2	3.5	0.6	4.22
Hay and alfalfa	1,883	2.3	10.7	1.8	5.68
Cottonseed	1,743	2.1	4.4	0.7	2.52
Citrous fruit	2,378	2.9	61.8	10.7	2.60
Other fresh fruit	5,174	6.3	97.8	17.1	1.89
Potatoes	4,114	5.0	44.5	7.7	1.08
Other fresh vegetables	2,927	3.6	65.2	11.3	2.23
Dry vegetables	869	0.9	9.7	1.6	1.06
Peanuts	248	0.3	2.5	0.4	1.01
Sugar beets	5,572	6.8	3.5	0.6	0.63
Cattle and calves	6,096	7.5	40.4	7.0	6.64
Sheep and goats	1,342	1.6	12.3	2.7	9.17
Hogs	4,500	5.5	30.8	5.4	6.85
Poultry and eggs	996	1.2	27.3	4.7	2.73
Total	81,688	100.0	574.4	100.0	.....
Food Products					
Flour	9,373	23.1	40.2	15.8	4.28
Other cereal products	9,476	23.3	32.3	12.6	3.41
Vegetable-oil meal and cake	2,262	5.6	9.0	3.5	3.97
Dried fruits	556	1.4	5.4	2.1	9.15
Meat and products	4,740	11.7	64.3	25.2	13.55
Margarine	24	0.1	0.4	0.2	16.66
Butter and cheese	768	1.9	16.1	6.3	21.00
Cottonseed oil	827	2.0	5.0	2.0	6.05
Other vegetable oils	600	1.5	4.2	1.6	7.00
Sugar	3,923	9.7	32.1	12.5	8.18
Molasses and syrup	1,217	3.0	6.3	2.4	5.18
Beverages	654	1.6	3.7	1.4	5.65
Ice	2,261	5.4	2.6	1.0	11.48
Canned food	3,954	9.7	34.2	13.4	8.67
Total	40,635	100.0	255.8	100.0	.....

How Can the Sun Affect Business?

By LAURENCE V. BURTON
Editor, Food Industries

WHEN crop yields on a per-acre basis are large or small in contrast to the yields of other years, what is the explanation? Ordinarily we attribute it either to good weather or unfavorable weather; but that is an explanation in terms of something else that needs explaining. What makes the weather of one season differ from that of another? Why have we experienced droughts and mild winters in recent years?

Men have been looking for the answer to that question for decades. Many years ago, Prof. S. P. Langley believed that the clew was to be found in possible variations in the radiation from the sun, and ever since that time the Smithsonian Institution has been studying the sun. In observatories located in Chile, Africa and Arizona, the work started by Dr. Langley is being carried on by Dr. C. G. Abbot and his associates. The solar constant of radiation is measured nearly every day in the year.

The net result of these studies is that radiation from the sun seems to vary slightly from month to month and year to year, yet it is believed to fluctuate around an average, or mean, of 1.940 calories per square centimeter per minute.

Although our effort has been to discern a possible correlation between yields per acre and the size of the solar constant of radiation, we have not yet been able to find a continuing relationship that seems to be at all informing, or even promising. Despite this lack of apparent correlation, however, we have not abandoned our studies in that line.

But because we have discovered a very curious relationship between the business indicators or indexes and the variations of solar radiation, we are publishing it at this time. The index used is the *Times-Annalist* Index, which extends back farther than our own *Business Week* Index. The values of the solar constant of radiation are the preferred monthly means from page 278, Vol. V, Annals of the Astrophysical Observatory, supplemented by the more recent observations. The solar curve has been smoothed by taking a three-month moving average.

The dotted line at the 1933 end is the preliminary forecast, derived by mathematical and graphic methods, indicating that the trend probably is to be downward for a time at least.

Just what this correlation signifies we do not know, nor do we try to explain it here. All that one may say today is that for the past twelve years business has been good when the solar radiation has been subnormal and poor when it has been above normal. To explain all the calculations and investigations back of all this would require more space than is available in this issue.

The possible influence of cosmic forces on the business of mankind is a fascinating subject for speculation. To the intensely practical mind it may seem so abstruse that is savors of the occult, or the hocus-pocus of the soothsayer. Yet everyone must admit that we are completely and absolutely dependent for existence itself on cosmic forces, for were it not for the radiations from a star which we call the sun, life would vanish from the earth.

In presenting the curves which apparently show the curious relationship between variations of solar radiation and general business we are omitting all discussion of the 30-year studies back of them, and the mathematical analyses of the data for periodicities.

Also it has been necessary to omit all historical background and the current theories which are employed to explain the possible relationship of the sun to business.

Not so many years ago, chemistry first began to be an industrial tool.

Just what this curve signifies for the future we are not sure right now. The solid line is a curve of solar constants of radiation smoothed by a three-month moving average. The January figure of 1,948 is the latest available, making the December smoothed average the last figure on the solid line. The forecast curve calculated in December is merely a prolongation of a running forecast that has shown a remarkably good "fit" for the past twelve years. In succeeding issues of *Food Industries*, the curves will be a regular feature. A revised forecast will be available in April.

Today, bacteriology is just coming into industrial use. It is predicted by astrophysicists and radio engineers that astronomy will be the next science to enter industry and business.

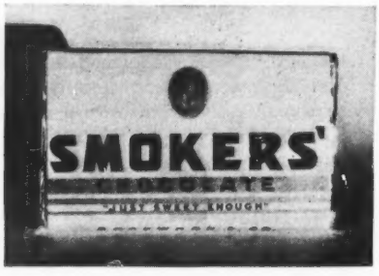
Right now the big questions are: (1) How correct is the curve of the forecast of solar radiation? (2) Will history repeat itself?

No further explanations of the subject will be published unless demanded by at least 500 readers, although the curve will be a regular feature of the Business Trend pages beginning with the April issue. We are indebted to Dr. C. G. Abbot, of the Smithsonian Institution, for permission to publish the march of the monthly means of the solar constant of radiation. Publication of the curve as a regular feature has been decided on because we feel that the majority of our readers will be interested in making their own correlations and following this interesting speculation.

NEW PRODUCTS
NEW METHODS

Chocolate for Smokers

An attempt to manufacture a chocolate bar for a particular market has been made by Rockwood & Co., Brooklyn, N. Y., in the introduction of its Smokers' Chocolate. Made to suit smokers' tastes, the new confection is produced by a formula which calls for much less than the usual amount of sweetening. This gives the product a strong and full-bodied texture and a vigorous flavor. With such a flavor, the candy



leaves no unpleasant after-taste when eaten by smokers.

To catch the eye of the prospective buyer, the confection is packaged in a wrapper printed in brilliant colors and designed with modernistic lines.

Process Preserves Juices

Experiments at the University of California's fruit products laboratory during the past three fruit seasons have produced a process for preserving the juices of peaches and apricots by canning. And the canned products retain their natural flavor and nutritious qualities, the inventors hold.

The process involves steaming halved apricots or peeled halved peaches to destroy oxidizing enzymes and thus protect the vitamins. The fruit is then passed through a tomato-juice-extracting machine to secure a very finely divided puree. To two parts of the puree is added one part of pure cane sugar syrup to produce the proper consistency and flavor. One method of blending consists of packing the proper volume of puree in the cans, then adding the syrup, exhausting in live steam 6 to 8 minutes, sealing and sterilizing in an agitating sterilizer. Or the syrup and puree may be mixed in a tank and poured into the cans by a syruping machine. Exhausting and sterilizing are then conducted as with the halved fruit in syrup.

The canned products may be used as breakfast and between-meal drinks or they may be served as a fruit ice. They are also used in desserts and sauces.

Grain Dried in Storage

Elevator explosions and losses from mildew in stored grain are said to be minimized by a system of drying and airing recently developed in Sweden. With the new system, air is blown through the body of the grain and around each particle at intervals of one or two hours, the period of airing being short. It is not necessary to heat the air, and the only expense is that of the installation and of the electricity used to drive the fans.

Tests on the new method of airing were conducted on a farm where the grain was stored immediately after being harvested, and it is reported that the grain dried as satisfactorily in the silo as in the open. The inventor maintains that the system is suitable for large elevators.

Five "57" Baby Foods

Five varieties of strained vegetables have been introduced to the baby food market by H. J. Heinz Co. These include carrots, spinach, peas, green beans and mixed vegetables for soup. The vegetables are prepared with dry steam in closed retorts in such a manner that soluble materials are retained. Air is excluded throughout the cooking, straining and packing, and the products are sealed promptly under high vacuum to preserve the vitamins. The

vegetables are packed without sugar, salt or other artificial seasoning. In making mixed vegetables for soups, some barley and rice are added as well as a yeast concentrate which increases the vitamin content.

No Can Opener Needed

Contrary to the exclusiveness that the royal name implies, King Cole Salted Nuts are readily accessible. So is their companion product, Baker's Walnuts. The

reason is that they are packaged in tin cans having the "punch and pry" opening feature. This type of can is not entirely new, but it has only within the past few months been adopted by General Foods Corp. for these products. No can openers are needed with these containers. They are so constructed that the top is completely torn off simply by punching at four points indicated by arrows and prying up on the lid.

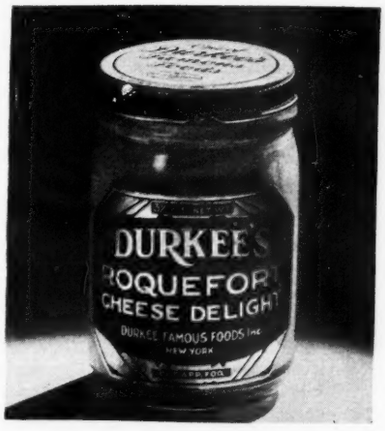
Nut-Brown Spaghetti

Nutty Brown macaroni and spaghetti are two products being made from the cottonseed flour manufactured by Nutty Brown Mills, Houston, Texas, as described in the January issue of Food Industries, page 29. These products have a nut brown color and are rich in protein and low in starch

content. They can be included in a reducing diet or in the diet of diabetics. The Nutty Brown flour is being sold to bakers for use in bread, being mixed in a ratio of 1 to 4 with ordinary flour.

Roquefort Cheese Delight

By using mayonnaise as a base, Durkee Famous Foods, Inc., New York, has produced a Roquefort cheese delicacy free of the strength and pungency of the genuine cheese, held to be distasteful to many people. The new product, Durkee's Roquefort Cheese Delight, is of a consistency that permits it to be spread easily on sandwiches and crackers, and it has sufficient body that it many be thinned with milk or cream and used as a salad dressing.



Imported Roquefort cheese from the village of Roquefort, Aveyron, France, is used in manufacturing the new delight, and the product is said to run approximately as high in calorific food value as the pure cheese itself. The new Durkee food is packed in 3½ and 8-oz. containers which retail for 25 and 35 cents, respectively.

Detect Approaching "Death"

It is possible to determine when pears are about to go "dead" in storage by a new method perfected by the Department of Agriculture at Wenatchee, Wash. The new method is considered important because some varieties of pears, especially the Comice, if stored too long, fail to ripen normally and are called dead. If storage men can determine when this stage is approaching, they can avoid the loss by placing the pears in a warmer temperature to hasten ripening.

By observing Comice pears in storage for seven months, testing them during that time for respiration and for the content of alcohol and acetaldehyde, the government specialists found that at the end of three months the acetaldehyde and alcohol content increased and that it increased rapidly after five months. The test also showed that respiration was much slower after six months and had practically ended after seven months, when the pears failed to ripen. From these observations it is believed a relation exists between the alcohol and acetaldehyde content and the termination of respiration.

60 Deg. F. Best for Potatoes

Bruised or skinned potatoes should be stored at temperatures near 60 deg. F. to minimize shrinkage, according to the Department of Agriculture. A similar conclusion has been reached by Cornell University Experiment Station, as reported by Food Industries in November, page 383.

In experiments by the Department of Agriculture, potatoes were stored for twelve weeks at temperatures of 32, 36, 40, 50, 60 and 70 deg. F. At temperatures above 40 deg., not only was most of the ordinary shrinkage prevented but the skinned areas healed over with the natural color of the skin of the potato. Potatoes kept at temperatures below 40 deg. had a dark brown or black scab. The higher temperatures also improved the cooking quality. At the highest temperature, 70 deg., the loss in weight was greater than at 60 deg.

The danger of excessive sprouting at the higher temperatures was removed by gradually reducing the temperature toward the end of the test period.

Whole-Wheat Dessert

Prepared dessert made of whole-wheat berry and flavored with cocoa powder is being manufactured by H. S. Morgan, Inc., Brooklyn, N. Y. This "Morgan's Whole Wheat Dessert" is really a chocolate pudding. It is manufactured by grinding the wheat berry, then flavoring it with cocoa powder and sugar, and blending, toasting and regrinding the material. The natural food values, including vitamin B and iron, are said to be retained by the process.

This whole-wheat dessert is packaged in boxes containing 3¾ oz. and retailing at 9 cents. At present it is being distributed in the Greater New York market. To serve, the consumer cooks it with milk and chills it in molds.

Soy Sauce Modernized

Sunburst designs bearing at their centers the Oriental symbol of perfection and good fortune give appropriate decoration to the new container for the Soy Sauce of La Choy Food Products, Inc., Detroit. Not only is the bottle attractive but it is practical. The broad base merging into a tapered neck provides stability and is easy to grasp. A shaker or sprinkler, integral with the container, makes it possible to obtain the exact amount of sauce desired. Beveled edges on the top practically eliminate dripping.

Radio Waves Kill Weevil

High-frequency radio waves have proved effective in ridding stored wheat of the destructive weevil. The waves not only kill the insect but they destroy its eggs and larvae. And it takes only a few seconds to accomplish all this. In laboratory tests made by Westinghouse at the instance of the Baltimore & Ohio Railroad, the weevils were killed almost instantly, and even the eggs and larvae succumbed in six seconds. Radio waves about 5 meters in length were used; these had no effect upon the wheat.

The investigation was carried into the field, and grain passing through a chute was successfully treated at the rate of 60 bu. an hour. This treatment consumed 13.8 kw. of short-wave energy.

These experiments are being continued and as yet the apparatus is not available commercially.

Quick-Freezing at 0 Deg. F.

Exposure to temperatures approaching —10 deg. F., or lower, is unnecessary for satisfactory commercial preservation of most fruits and vegetables, according to H. C. Diehl, who has been in charge of freezing experiments conducted at the Seattle laboratory of the Department of Agriculture. Some exceptions were found to this rule. With asparagus, the fresh quality seemed to be best retained by rapid freezing at —20 deg. F., or below. With apricots, freezing rapidly at —30 deg. F. seemed to give best results with regard to texture and original color. In quick-freezing at temperatures around 0 deg., however, it is essential that the freezing method involve a rapid heat transfer through increased refrigerating efficiency.

Storage tests made at the laboratory indicate that for most horticultural products, 15 deg. F. is best for long-time storage.

MEN, JOBS AND COMPANIES

INDUSTRY

ASSOCIATION OF PACIFIC FISHERIES, Seattle, believes in doing something about the situation in the salmon canning industry, so the officers made themselves heard through the Washington State Legislature via a memorial to Congress urging early passage of the Hill Depreciation Currency Bill.

GREAT ATLANTIC & PACIFIC TEA CO. is stepping up production in the baking plants of its eastern division by 15 to 25 per cent. This increase will be coupled with a definite campaign to increase consumption.

CROSSE & BLACKWELL CO., Baltimore, Md., apparently has never heard of the depression. Employment in the plant at Baltimore jumped from 200 in 1929 to nearly 500 in 1932. Plans for 1933 call for the expenditure of several thousand dollars on advertising and an increase in retail outlets in New England to approximately 10,000. Tonnage in this market has jumped from less than one to about six cars a month.

GRANITE CITY COOPERATIVE CREAMERY, Barre, Vt., has been able to keep on its payroll all winter the men who ordinarily would have been discharged at the end of the ice-cream making season. This has been accomplished by working five days weekly instead of six and by establishing an employment fund to which management and salaried employees contribute a day's pay weekly.

HILL BROS. CO., New York, has further refined its "flash" process for canning Dromedary Grapefruit Juice so that the elapsed time from whole fruit to sterilized and sealed juice in the can is now reduced to 3 minutes. It is said that the improved process eliminates any possibility of "cooking" or loss of flavor.

PROTEO FOODS, INC., will exhibit at the World's Fair a new bread made by a process involving treatment by certain screened wave lengths of light for the elimination of mold. The exhibition will be made through W. E. Long Co., which developed the treatment.

MAYONNAISE INSTITUTE, New York, was created by Mayonnaise Manufacturers' Association at its recent annual meeting to take over the association's research and educational work. W. F. L. Tuttle, executive vice-president, will direct the institute's activities.

NATIONAL LABORATORIES, LTD., Halifax, N. S., a subsidiary of Maritime-National Fish, Ltd., is now producing fully refined medicinal cod-liver oil. The oil is extracted from the freshly caught fish on trawlers at sea and undergoes a final processing in the company's laboratories at Halifax.

NEW ENGLAND CONFECTIONERY CO., Cambridge, Mass., acquired the business of Lovell & Covel Co., Cambridge, Mass., March 1, transferring the entire operations of the latter to the former's plant. Lovell & Covel products will continue to go direct to retail outlets under their regular brand names, and the company will function with the same management and personnel.

NATIONAL CONFECTIONERS ASSOCIATION began on Feb. 20 to get ready for its Golden Jubilee Year Exposition to be held at the Hotel Sherman, Chicago, June 19-23. Exposition headquarters are 225 West 34th St., New York, N. Y.

J. FRED SCHMIDT PACKING CO., Columbus, Ohio, has established a business and promotional department through which its business activities and dealer outlets will be increased. Charles Reeb is in charge.

SIEBEL INSTITUTE OF TECHNOLOGY, Chicago, is now conducting its regular course in brewing, having inaugurated it Feb. 6.

W. F. L. TUTTLE
Head of new Mayonnaise Institute

According to E. P. Siebel, president, the knowledge of brewing has been enhanced during the period of prohibition and American beer will be equal to the best.

SOUTHERN MAID DAIRY PRODUCTS, INC., has been formed by the consolidation of three dairy product companies operating in West Virginia, Virginia, Tennessee, Kentucky and North Carolina, involving properties valued at $750,000. The merging firms include Southern Refrigeration Co., Bluefield, W. Va.; Holston Creamery Co., Bristol, Tenn.; and Southern Ice Cream Co., Johnson City, Tenn.

STANDARD BRANDS, INC., together with Fleischmann Co. and Widlar Corp., Cleveland, is involved in a patent infringement suit for $250,000 filed by Emulsol Co., Chicago. The patent involved is owned by Emulsol and covers a process for producing salted frozen egg yolk. It is contended that Fleischmann salted yolk supplied to Widlar infringes on the patent.

WILLIAM WRIGLEY, JR. CO. will increase the wage scale of its factory workers to offset the loss of pay resulting from short hours. The increase in salary is the result of the company's belief that the maintenance of wage scales is the only way to obtain prosperity.

PERSONNEL

L. H. BOND, Bond Pickle Co., Oconto, Wis., was elected president of Pickle Packers' Association at its annual convention in Chicago. Other officers include W. S. Cooke, Harbauer Co., Toledo, vice-president; C. J. Sutphen, Chicago, treasurer; Joseph E. Mitchell, secretary. The pickle packers discussed standards at the meeting and the consensus was that army and navy specifications for pickle products be adopted commercially.

WALTER G. CAMPBELL, director of regulatory work in the Department of Agriculture, resigned Feb. 1 to become chief of the Food and Drug Administration. The position of director of regulatory work has been abolished. Mr. Campbell was one of the first inspectors appointed under the Food and Drugs Act passed in 1906. By 1914, he had risen to director of the eastern inspection district of the Bureau of Chemistry, and he became acting chief of the bureau in 1921.

WILLIAM H. HOLMES, former president of Fox River Butter Co., Aurora, Ill., and for the past 35 years connected with the poultry, butter and egg business, has been made vice-president and general manager of Lackawanna Cold Storage Co., Scranton, Pa. For the past eight years Mr. Holmes has been manager of the New Haven branch of Beatrice Creamery Co., this branch being known as Dillon & Douglas. He has also served with Holland Butter Co. and Frank Sweeney Co.

LOWELL B. KILGORE, who worked at Mellon Institute for two years as a research fellow for Mayonnaise Manufacturers' Association, is now doing private research on foods and pharmaceuticals. He is located at Colloid Research Laboratories, Washington, D. C., and has arranged with a food mnufacturer to use his plant for technological experiments.

FRANK C. LOWRY recently resigned as vice-president of National Biscuit Co., New York, and will become active in Lowry & Co., New York, his old firm. In 1932, Mr. Lowry left his sugar business to become president of the National Biscuit Co., and his resignation from that office follows a shift in personnel which made R. E. Tomlinson, formerly chairman, president of the company and moved Mr. Lowry into a vice-presidency. It is reported that Mr. Lowry is being advocated as Ambassador to Cuba.

SIMON MILLER, director of Sweets Co. of America for several years and a leading business man in Newark, N. J., became president of the Sweets Co. Feb. 20 to succeed George L. McMunn, resigned. There will be no change in company policies.

FRANCIS MILLARD, prominent British Columbia salmon canner, plans to establish a large cannery at Prince Rupert, B. C. The cannery will be ready for operation during the 1933 season. It is planned to ship canned salmon direct from Prince Rupert to the British and other overseas markets.

J. J. MULLIGAN, formely editor of *The Canner*, has been named manager of the new dried fruit, canned goods and grocery specialties department of Calumet Tea & Coffee Co., New York. Mr. Mulligan re-

signed as editor of *The Canner* in October, 1932, after serving the food industries for many years in an editorial capacity.

WALLACE T. JONES, who has spent almost two decades with Rockwood & Co., Brooklyn (N. Y.) chocolate manufacturers, has been made president of the company. Mr. Jones succeeds WILLIAM M. EVANS, who was made president eleven years ago to succeed the father of Mr. Jones. Mr. Evans now becomes chairman of the board. S. P. GOBLE, senior vice-president, was reelected. H. RUSSELL BURBANK, in charge of the bulk department, was promoted to a vice-presidency, and E. W. BREWER, comptroller, was made secretary.

W. F. RENFRO was recently made general manager of the East St. Louis plant of Armour & Co. to succeed G. T. MCCLEAN, who has resigned. Other changes in Armour personnel include the appointment of E. E. EVANS, manager of provision sales, Chicago, to plant manager at Oklahoma City; the appointment of A. E. ADDLEMAN, Jersey City plant, to manager of the Chicago provision sales department; and the appointment of E. D. MACMANUS, division manager, Chicago, to assistant manager at East St. Louis.

P. L. SMITHERS, JR., president of Booth Cold Storage Co. in 1932, became connected with the Chicago Cold Storage Warehouse Co., in the selling end of the business, Feb. 1. Mr. Smithers spent more than seventeen years with Booth and was general manager of that concern from 1927 until January, 1933.

JOHN WATERHOUSE, president of Alexander & Baldwin, has been reelected president of the Association of Hawaiian Pineapple Canners. Other officers chosen at the annual meeting include GEORGE WARD, California Packing Corp., vice-president; ARTHUR L. DEAN, Alexander & Baldwin, secretary-treasurer.

LOWELL WILSON, president of the Indiana Condensed Milk Co., Indianapolis, was made president of Evaporated Milk Association at its annual meeting in Chicago. E. H. STUART, president of Carnation Milk Co., Milwaukee, was elected vice-president; H. E. ANNELL, Oatman Condensed Milk Co., Dundee, Ill., treasurer; and FRANK E. RICE, Chicago, executive secretary.

LOUIS A. ZAHRN, treasurer of General Foods Corp. since 1928, recently celebrated his 30th anniversary with the company. When Mr. Zahrn joined General Foods in 1903 it was known as Postum Cereal Co. He moved to New York in 1922, when the headquarters were transferred from Battle Creek, Mich., and in 1928 he was appointed treasurer.

DEATHS

CRAIG ATMORE, 58, president of Atmore & Son, Inc., mince-meat manufacturers, died recently at his home in Wayne, Pa. Mr. Atmore entered the food industry 38 years ago, when he became associated with his father, who had founded Atmore & Son. In 1908, he became president of the company, succeeding his father.

EUGENE C. DE BORGER, 37-year-old founder and president of the Jean de Borger Bean Co., Inc., Syracuse, N. Y., died Feb. 3 of monoxide-gas poisoning. He has been operating the bean company for 14 years.

EDWIN A. DAVIS of Milford, Ill., died recently of an obscure illness contracted in Russia where he was one of a party of erecting engineers at the Krimskaya canning plant. He was formerly connected with Milford Canning Co.

CLARENCE H. ECKELS, chief of the dairy husbandry division of the University of Minnesota, died at St. Paul, Minn., Feb. 13, following an operation for gallstones. Mr. Eckels, who was 58, was a national dairy authority.

JOSEPH W. HATCH, who had been a member of the New York Produce Exchange for 52 years, died Feb. 1, after an illness of about four weeks. He was 72 years old. Mr. Hatch became connected with the grain business in New York when only 20 years of age and he was associated with S. V. Tripp & Co., who built New York's first grain elevator in 1879.

CHESTER W. KNIPE, treasurer of Perfect Foods, Inc., Lansdale, Pa., which he organized, died Feb. 4 from a shock suffered in an auto accident. Mr. Kripe, who was 41 years old, was a newspaper man before entering the food field.

WALLACE T. JONES
Rockwood & Co.'s new president

JOHN MCKINON, general manager of Amboy Condensed Milk Co., Amboy, Ill., died Feb. 11 from a sudden attack suffered while watching firemen fight a blaze.

MILLARD K. PALMER, retired oysterman who had spent a half century in the fishing business, died Feb. 14 of heart attack. His death occurred at his home in Greenwich, Conn.

ALBERT W. PELL, treasurer of Lamont, Corliss & Co., died recently at his home in Brooklyn. Corliss & Co. were the sales agents for Peter Cailler Kohler Swiss Chocolates, Inc., New York.

ROBERT T. RODEHAMEL, for the last 16 years Cleveland branch manager for Loose-Wiles Biscuit Co., died Feb. 16, following a brief illness caused by heart attack. Mr. Rodehamel, who was 61, had been associated with the baking industry for almost 40 years.

J. K. STEWART, Michigan and Ohio manager of Beech-Nut Packing Co., died at Columbus, Jan. 29, of heart disease. He was 55 years old.

PORTER R. WALKER, Walker Creamery Products Co., Warren, Pa., died Feb. 14, at the age of 57. Mr. Walker was active in the ice cream trade, being among other things the first treasurer of the former Pennsylvania Ice Cream Manufacturers' Association and also a former vice-president of International Association of Ice Cream Manufacturers.

ASSOCIATED INDUSTRIES

BROWN BROS. MFG. CORP., 9-11 Canal Place, New York, is introducing a packaging machine which fills pint and quart paperboard containers with ice cream and closes them. The machine has been tried out in the central packaging plant of Borden Co., New York, and was described in FOOD INDUSTRIES, October, 1932, p. 331.

CANNING MACHINERY AND SUPPLIES ASSOCIATION, Chicago, reelected Fred K. Taylor president and H. J. Carr vice-president at the annual meeting held recently in Chicago. At this meeting considerable doubt was expressed as to whether the association would hold an exposition in 1933.

GENERAL MARKETING COUNSELORS, INC., New York, Chicago, Milwaukee and Des Moines, was recently organized to conduct an industrial market research and consulting service. It has a staff of nine experienced research men and resident field investigators in 100 cities. L. D. H. Weld, research director for McCann-Erickson, Inc.; V. H. Pelz, editor of *Food Field Reporter*, and J. David Houser, president of Houser Associates, are in the New York office.

DAIRY & ICE CREAM MACHINERY AND SUPPLIES ASSOCIATION has decided that there will be no Dairies Industries Exposition in 1933. It was felt that omission of the exposition this year would be desirable on account of the present economic conditions. At the annual meeting recently held in New York, H. H. Miller, H. H. Miller Industries, was reelected president and H. A. Keiner, Keiner-Williams Stamping Co., was reelected vice-president.

NATIONAL RESEARCH COUNCIL announces plans for the revision of its directory of industrial research laboratories. All firms maintaining research laboratories have been requested to inform the Council. The address is 2101 Constitution Ave., Washington, D. C.

PACINI LABORATORIES, INC., Chicago, recently moved to larger quarters at 155 East Ohio St. and added to its staff the following personnel: H. C. Cooper, Benjamin Maisel, Marion Carroll Simon and Raymond Crosley. These additions give the laboratories specialists in electrochemical research, organic chemistry and home economics. The laboratories do food research work and have a special vitamin research department.

ROBERTS EVERETT ASSOCIATES, New York, has been retained to manage the Exposition of Allied Industries to be held in connection with the 50th Annual Convention of National Confectioners' Association. The convention and exposition will be held at the Sherman Hotel, Chicago, June 19-23.

BUSINESS TRENDS

Big Battle for Soup Market Expected in East

Various canners engaged in the production of soup, juices and baked beans are showing substantial gains in their consumer market. Crosse & Blackwell Co., Baltimore, Md., reports that its retail outlets in New England have increased from less than 200 in 1931 to approximately 10,000 in 1933. The company is building a new warehouse to handle its products, as is Edgar F. Hurff, Swedesboro, N. J. The latter announces that growing business demands additional space for storing asparagus and tomato products.

In the past three years new packers have entered the soup, juice and baked bean fields in the Tri-State territory. Notable among these is P. J. Ritter Co., Bridgeton, N. J., which has made large additions to its plant since 1929. Phillips Packing Co., Cambridge, Md., also recently entered the field and is now selling its products throughout the East. George A. Hormel & Co. represents an even larger newcomer. Another growing factor in the field is H. J. Heinz Co., which recently brought out three new soups.

The net result of these developments apparently will be a grand battle for the market. The established companies will attempt to hold on in face of encroachment by the newcomers and the result will probably be reduced prices to consumers and lower rates to growers.

BASIS FOR THE CURVES

Retail food prices, factory employment, factory payrolls and wholesale prices are based on indexes of the Department of Labor. Cost-of-living index is that of the National Industrial Conference Board. Electrical power consumption figures are furnished by *Electrical World*.

Rise in Food Prices Not Maintained

General unsettledness in financial, political and weather conditions has left business in a dizzy state.

After touching 55 per cent of normal for the week ending Jan. 14, *The Business Week* index of business activity turned downward. It has continued downward to 51.4 per cent of normal for the week ending Feb. 18. Part of this weakness is explained by lack of bank business in Michigan.

During the recent spell of winter weather, commodity prices, particularly those for food, turned sharply upward. However, the quantity of food available was too great and the cold spell too brief for the higher prices to be maintained. The net change for the month ending Feb. 18 shows an increase of 1.14 per cent in price of foods, with no change in general commodity prices, according to a weighted index. Wholesale prices, as reported on Feb. 18 by U. S. Department of Labor, show decreases of 1.79 per cent for all commodities and of 3.04 per cent for food during the period since Jan. 21.

The effect of unseasonably warm weather in January is reflected in the 25.5 per cent decrease in A. & P. tonnage sales when compared to December volume of business. The January, 1933, sales were 6.08 per cent below those for January, 1932.

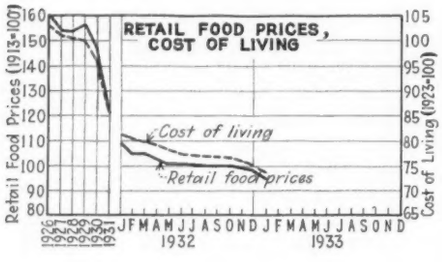
Predict Important Changes In Vegetable Growing

Commercial canners and growers face seriously curtailed markets in 1933 for canned and fresh vegetables. And all other food concerns are likewise affected. Both the government and vegetable seed companies predict a large increase in home gardening. An example of this is seen in Arkansas, where it is planned to produce food supplies for 1,000,000 people through community gardens and a back-to-the-farm movement. One seed company has predicted a 100-per cent increase in home vegetable production this year.

Another trend forecast by the government is that much more of the supplies will be grown locally this year. This is predicated upon the fact that market prices have declined while shipping rates have been maintained, making it difficult to move produce cross-country at a profit. This condition may curtail out-of-season shipments of fresh vegetables, a situation favorable to canners, though hardly favorable enough to offset the loss due to home gardening.

As to the indicated commercial production of vegetables, a government survey of "intended" acreage points to production on a level with that of 1932. And in the South, early growers are expanding production, according to reports received by the government up to Jan. 15.

However, reports from certain large seed companies in the latter part of February indicated a decline in commercial plantings, although bearing out the prediction of increased home gardening. Two seed concerns on the West Coast and two in the East report a sharp decrease in


RETAIL FOOD PRICES, COST OF LIVING
Retail Food Prices (1913=100)
Cost of Living (1923-100)
Cost of living
Retail food prices
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1932
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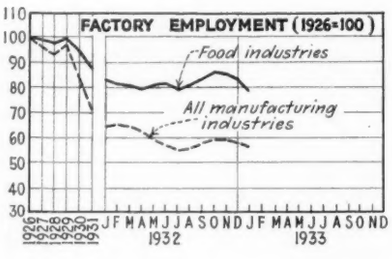
FACTORY EMPLOYMENT (1926=100)
Food industries
All manufacturing industries
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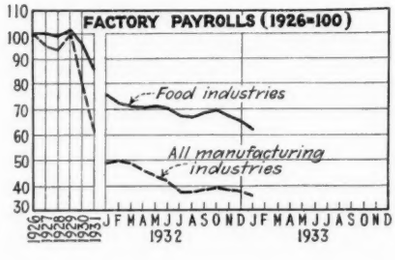
FACTORY PAYROLLS (1926=100)
Food industries
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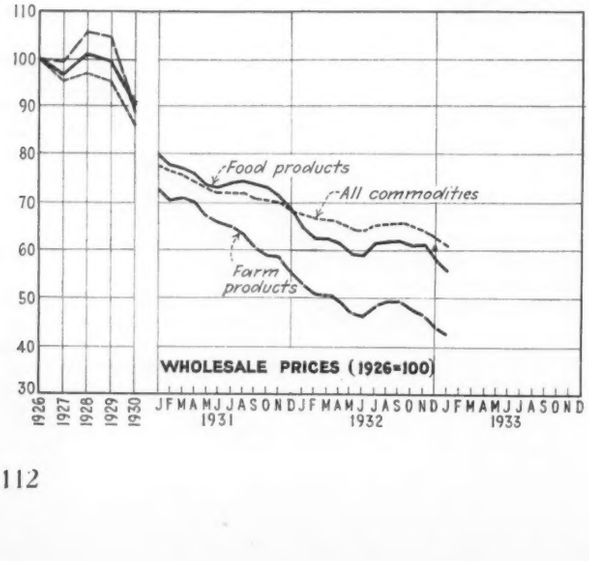
WHOLESALE PRICES (1926=100)
Food products
All commodities
Farm products
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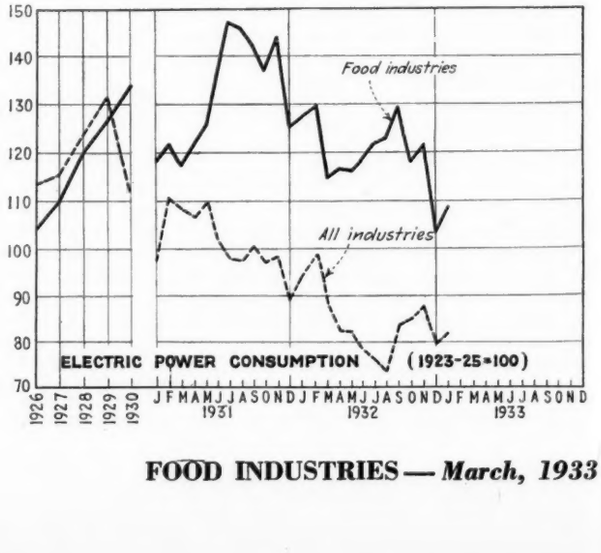
ELECTRIC POWER CONSUMPTION (1923-25=100)
Food industries
All industries
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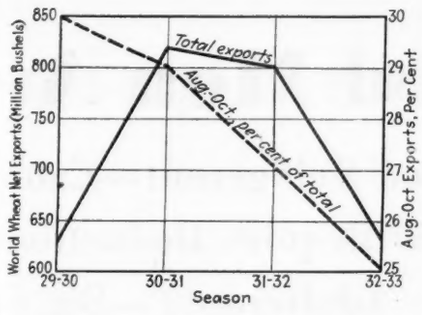


Trend in world exports of wheat, figures for 1932-33 being a forecast. From report by International Institute of Agriculture.

sales of seed to commercial growers, one placing the drop at 40 per cent.

It is interesting to note that production of vegetables for the fresh market has increased 60 per cent in ten years and that from 1925 to 1931 home gardening declined 29 per cent.

Depression Causes South To Produce Own Food

Northern food producers are rapidly losing an important market for "exports" —the South. The depression started a vast movement that appears likely to decrease the dependence of the Southeast on outside sources of supplies of food for both man and animals. It is estimated that about 60 per cent of the winter supply of fruits, vegetables and meats required in the Southeast in 1932 was produced in that section. Approximately 50 per cent of the animal feed requirements also was locally grown last year, comparing with 15 per cent in the 1926-29 period.

Various interests are promoting the development of the South. Important among these is National Cottonseed Products Association, whose secretary, Earl S. Haines, is active in publicizing the desirability of such a trend. He also is working for favorable oleomargarine taxation.

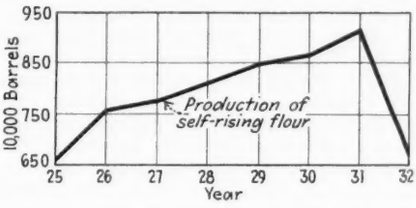
No Shortage Exists in Hogs Despite Price Rise

Considerable speculation is being indulged in as to the correct interpretation of the condition of hogs arriving at central markets during the past 60 days. Farm papers and farmers give it the bullish slant and believe the somewhat low quality of animals denotes the clean-up of a short pig crop, and, in substantiation of this, point to a price rise throughout January that held as well as could be expected in February despite the disquieting news from Michigan and Washington.

The light quality of the animals does not seem compatible with the huge supplies of corn. An investigation by FOOD INDUSTRIES discloses that it is due largely to a combination of influences, chief of which are fear of a declining market and poor feeding. Pasturage west of the Mississippi River has been depleted by drought, farmers have been too poor to buy protein supplementary feeds, and little money has been spent to protect hogs against disease. All farmers who can do so appear to be holding back their hogs for higher prices.

There are, however, plenty of hogs in the country, although hog runs have been slightly below normal in size. The shortage theory seems to be only hopeful wishing.

The crop of hogs to be marketed from April to October, 1933, will probably be the largest on record, for by that time the feeding animals will begin to attain uneconomic weights and come to market irrespective of price. But any earlier price rise will probably bring them to market at once. October, 1932, to January, 1933, slaughter was down 9 per cent from a year ago, presumably presaging a continuing decrease until April, after which the flood may be expected. The Hugenburg tariff increase on lard entering Germany complicates the trend by tending to defer marketing.



Trend in production of self-rising flour in the United States, based upon sales of bicarbonate of soda. From report by Department of Agriculture.

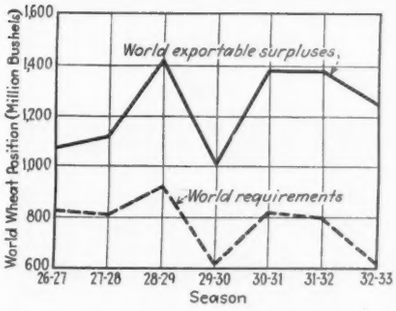
February Cold Wave Damages Fruits and Vegetables

Fruit and vegetable crops suffered considerable damage over a wide area as the wintry winds and abnormally low temperatures swept the continent early in February. Preliminary surveys by the Department of Agriculture indicate that all the young tomato plants were killed in the Imperial Valley, but that one-third to one-half the acreage of the mature plants would be revived by new shoots. In the lower Rio Grande Valley, Texas, pea acreage was cut 50 per cent. Tomatoes were damaged but the acreage lost will be replanted. The damage to spinach was not heavy but the tonnage and quality of the crop is expected to be lowered.

Extremely heavy damage is reported in the Corpus Christi area. Ninety per cent of the Corpus Christi cabbage acreage is killed and the balance severely damaged. Carrots are damaged to the extent of 45 per cent; beets, radishes, peas and turnips are a total loss. The quality of the onion crop will be greatly reduced; spinach was burned considerably.

In Mississippi, the cabbage crop may be 15 to 30 per cent less than preliminary estimates unless plants are brought in from the outside. In Louisiana, preliminary investigation indicates heavy losses in lettuce, broccoli, eggplant, okra, endive, cucumbers, snap beans, green peas, and escarole. Other crops suffering material damage include tomatoes, onions, cabbage, carrots, shallots, potatoes, spinach, sweet peppers, radishes and turnips.

Reports from the Middle West indicate heavy losses to the winter wheat crop, since the fields in many sections were unprotected by a blanket of snow when the subzero winds swept the country.



Trend in world wheat position, figures for 1932-33 being a forecast. From report by International Institute of Agriculture.

Indicators

A PORK PACKER in St. Paul has been able to sell split dressed hog carcasses delivered to Boston under proper refrigeration at $4.95 per 100 lb., delivered price.

SHRIMP CANNERS have curtailed operations until the total pack as of Jan. 31, 1933, is only 482,463 cases, a decline of 23 per cent as compared with the same period last year.

CANNED BEET production in the United States continues to drop. Amounting to 2,923,063 cases in 1930, it fell to 1,322,187 cases in 1931 and 882,952 cases in 1932.

WORLD SUGAR production for the crop year ending Aug. 31, 1933, will amount to 24,735,000 long tons, according to Lamborn & Co., Inc. This represents a decrease of 1,696,000 tons, or 6.4 per cent, as compared with the previous year. World consumption of sugar for 1932-33 has been estimated at 26,585,000 tons, a decrease of about ½ per cent.

COLD-STORAGE holdings of fruits, dairy products, eggs and meats continue to decline. Of 36 items reported as of Feb. 1 by the Department of Agriculture, 29 declined as compared to the same date a year ago, while only 7 were higher than on that date.

STRAWBERRIES from Louisiana are expected to command a higher price this year. The recent cold snap is responsible. It has materially retarded the growth of the berries, which means that the Florida crop will be marketed earlier. In recent years, both crops were on the market at practically the same time, and this resulted in an oversupply which kept prices down.

THE NET INCOME of the food industries declined only 11.1 per cent during 1932 as compared to a total decline for all industrial concerns of 94.1 per cent.

CANNED FOODS are piled high on the cellar shelves of homes in Nebraska. Approximately 8,000 housewives have more than nine tons of dried fruits and more than a million and a quarter jars of fruits, vegetables and juices in storage. The total represents about 160 qt. per family. In Monroe County, Ark., 9,748 jars of canned meat were packed by home canners in 1932.

THIS MONTH—

MARCH

1-2—Fourth Annual Greater New York Safety Conference, Pennsylvania Hotel, New York, N. Y.

7-10—American Management Association, Third Annual Packaging Exposition and Consumers' Marketing and Packaging Conferences, Hotel Pennsylvania, New York, N. Y. Kenneth B. Andersen, secretary, 20 Vesey St., New York, N. Y.

13-16—American Society of Bakery Engineers, Edgewater Beach Hotel, Chicago, Ill. Victor E. Marx, secretary, 1541 Birchwood Ave., Chicago.

26-31—American Chemical Society, Eighty-fifth Meeting, Willard Hotel, Washington, D. C.

Hors d'Oeuvres

IN A CONTEST for serviceable containers the award should go to Capstan Glass Co. for its new jelly glass, which is shaped like, has a handle like, looks like, and in fact is, a beer mug.

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STUDENTS of the habits of the hog, on the one hand, prefer left-ham sandwiches, but students of physiology, on the other hand, prefer right-handed sugar. It seems that the swine in scratching himself exercises his right ham more vigorously than his left, making it tougher. As for sugar, the types that rotate polarized light to the right, such as dextrose, produce better muscular control.

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SENSITIVE CRITTERS, these swine. At least experts for the New York Central Railroad tried to make the judge think so. The railroad was sued by Choice Boneless Ham Co. when the latter received a carload of spoiled hams. The experts ventured the theory that the hams were tough because the swine were terrorized on approaching the executioner's block.

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WHEN is a sardine not a sardine? When it is not a Sardina pilchardus, of England, France, Portugal, Spain and portions of the Mediterranean, according to the Australian Customs Department. However, the Australians don't object to other small fish masquerading as sardines as long as the labels denote the country of origin.

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YOU CAN feed your corn and sell it too, farmers in Hiawatha, Kan., have proved. It's like this: You buy the corn at 10 to 20 cents a bushel. Then you shell it, feed the shelled corn, and get back the original cost by selling the cobs at $3 a load.

•

GREECE has more currants than the people care to eat and not as much wheat as they want. A problem to economists—but not to the Greeks. They simply decreed that bakers substitute currants for some of the wheat in one of every four loaves of bread.

What Food Men Are

Tomato Men Belligerent—Canners
Loans Require Reductions—
Adulterant?—Big Bear

TOMATOES might have been hurled instead of words had there been a basketful in evidence at the heated session on the love-apple tariff held in Washington Feb. 13 by the Tariff Commission. Representatives of the California and Florida growers, importers, and officials of the Southern Pacific Railroad and the Wells Fargo Express Co. became quite antagonistic. The growers accused the railways of promoting a tariff readjustment for their own profit and the railways and importers retaliated with the contention that the tariff of 3 cents per pound cost the citizens of the United States $12,000,000 annually and that tomatoes from Mexico were shipped in at a time when the market could readily absorb them.

The climax came when counsel for the Florida growers declared that the President or the commission had exceeded authority in calling the hearing on a notice of 10 days instead of the regular 30 days. Shortly afterward, the proceedings were adjourned until after the close of the current crop season.

CANNERS can no longer use "U.S." on their grade labels. The grading service of the Department of Agriculture is to be limited to the grading of submitted samples or samples drawn from commercial lots. Inspectors will not be placed in canneries for continuous inspection of the canning process, a prerequisite to the use of the U. S. grade. However, the products may be designated as "Grade A," "Grade B" and so on.

The Senate Committee on Agriculture, in reporting the agricultural appropriation bill, would have eliminated canned fruits and vegetables from the inspection service, entirely. But its proposed amendment was rejected and the language of the bill restored to the same form as in the appropriation act for the preceding year. This authorizes the market inspection service of the Bureau of Agricultural Economics to investigate and certify the class, quality and/or condition of canned fruits and vegetables. But a letter read into the record of the Senate proceedings limited the inspection service to samples submitted or drawn from commercial lots.

FLOUR MILLS would have to pay a tax at the rate of 60 cents a bushel, and then put out approximately a million dollars daily on credit, running the risk of bank failures as well as credit risks with buyers, if the Domestic Allotment bill were enacted into law, according to Fred J. Lingham, president of Federal Mills, Inc., Lockport, N. Y., and chairman of the legislative committee of the Millers' National Federation.

Mr. Lingham said that many mills would be put out of business, as profits in 1932 were under 10 cents a barrel, permitting no absorption. He declared that the tax would make the price of wheat more than four times the average of prices of rye, corn and potatoes, its principal competitors, and therefore would reduce consumption.

Other interesting facts brought out by Mr. Lingham were the following: If the commodities covered by the plan were limited to wheat and cotton only, one-third of the bonus would go to two states; one-half would go to six states. If wheat only were left in the bill, farmers themselves in nineteen states would pay more than they received.

The tax of 60 cents a bushel would unquestionably increase the cost of flour $3 to $4 a barrel, according to grade, depending on whether byproducts advance in price, and 1 to 1½ cents per pound loaf of bread.

REDUCTION of 30 per cent in the acreage planted to cash crops will be required this year from farmers who procure crop production loans, Secretary of Agriculture Arthur M. Hyde has announced. And in addition to the reduction required, borrowers must agree to plant a garden for home use and a sufficient acreage of feed crops to supply feed for their livestock. Acreage taken out of cash crop production may be planted in soil-building crops. This may increase the production in 1934 through improved fertility.

Reductions, however, will not be required of farmers who plant no more than 8 acres of cotton; 2½ acres of tobacco; 40 acres of wheat; 20 acres of corn; 2½ acres of truck crops; 12 acres of sugar beets; 8 acres of potatoes; 30 acres of rice; or 8 acres of peanuts.

Reconstruction Finance Corporation funds to the amount of $90,000,000 are made available for the crop production loans. The amount available to any farmer is limited to $300. In 1932, crop production loans were made to 507,632 farmers, averaging $126 each.

PRICE-CUTTING tactics and loss-leader sales have recently brought many complaints to grocery manufacturers. So Associated Grocery Manufacturers of America has officially condemned this practice as uneconomic and unfair price competition. The association also has recommended that each grocery manufacturer individually act to prevent this practice and that each state enact a law duly prohibiting it.

To facilitate enaction of legislation the

Doing and Saying

Can't Use "U. S."—Allotment Plan—Price Cutting Hit—Vitamin D Booms—Food Broadcasting

AGMA has drafted a model state law "to protect intrastate commerce against unfair price competition." Section 1, part (*a*), states that "the term 'unfair price competition' means the advertisement or offer for sale of an article of merchandise at or below its purchase cost, in the course of intrastate commerce in this State, which is made to promote the sale of other merchandise and which is effective or has a dangerous tendency either to unduly lessen competition or to create a monopoly in any line or part of such commerce." Section 2 declares unfair price competition unlawful, Section 3 is an enforcement clause, and Section 4 provides for injunctive relief and/or the recovery of threefold damages.

HOG RAISING in the Netherlands will be maintained on a profitable basis, it seems, even if the packing houses do suffer. To that end, the government has raised the tax on hog slaughtering from $1.64 per 100 lb. as fixed on Aug. 15, 1932, to $1.82 per 100 lb. This tax is levied to raise funds for price stabilization, the funds being under the control of the Netherland Hog Central. The Central also has charge of the enforcement of a system of production control and has exclusive right to import and export hogs and pork products.

The scheme for controlling production is interesting. It centers upon a system of earmarking and of penalties for the possession of hogs that are not properly earmarked. The control phase arises out of authority delegated to the Minister of Agriculture to determine the number of marks available for the various territories. The payments to producers are above the prevailing market price but below a calculated cost of production. However, the plan calls for gradual increases until the price paid somewhat exceeds the cost of production.

In regard to exports, the law provides for a tariff that compensates for the differences between the world market and the home market.

VITAMIN D has run up against a snag in Buffalo. The board of health there voiced the opinion that it is a medicine and should be taken as a medicine, not as a food in milk, and that while some milk consumers may require it for their well-being, many do not, and to the latter it might be harmful. The board delayed taking positive action until the Corporation Counsel completed his opinion as to whether the inclusion of vitamin D in milk constituted adulteration.

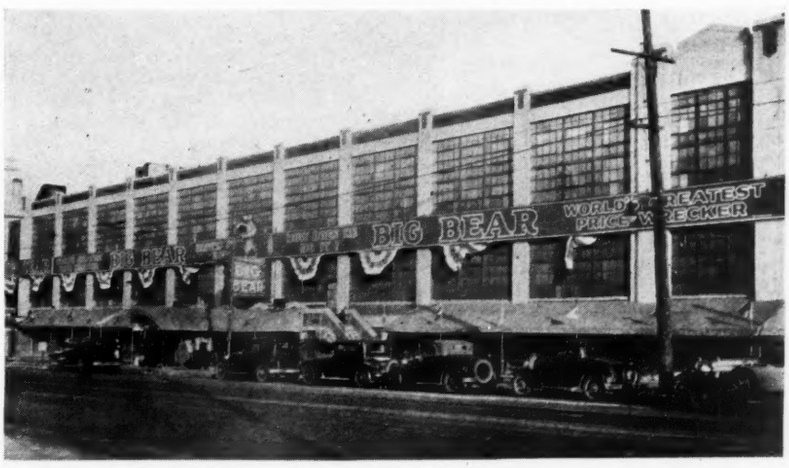
According to Francis Fronczak, Health Commissioner, vitamin D used in bread would not be in violation of the state law. At any rate it isn't a violation in Michigan, for J. W. Kennedy Dairy Co., Detroit, is producing vitamin D milk—with the approval of the American Medical Association.

FOOD MANUFACTURERS are racking their brains over the price-wrecking supermarkets which threaten to spread throughout the East. What troubles the manufacturers is whether they should support the proponents of shattered prices by selling them merchandise or whether they should refuse to let them have any produce.

The latest and the most gigantic of all the supermarkets is the "Big Bear," in the old Durant plant on Frelinghuysen Ave., between Newark and Elizabeth, N. J. This market is already doing a weekly business of $100,000, and plans are being made to increase the floor space from 50,000 sq.ft. to three or four times that area. This "world's greatest price wrecker" has attracted its astounding volume of business with a price list exemplified by the following: eggs, 1c each; milk, Grade B in Sealcone containers, 8c. a quart; Swift's Premium hams, 10c. a lb.; Campbell's pork and beans, 4c. a can. During a recent "sale," Premium hams sold for 5 cents. These prices are made possible by extremely low rent, large volume of business, small operating cost and a net profit of 1 to 2 per cent. The Great Bear further cuts handling costs by a spur track which accommodates ten freight cars.

Two prominent manufacturers of biscuits have refused to sell further goods to the Big Bear because of its cut-price policy, it is reported. Pressure from retailers probably will be brought on other manufacturers to force them to follow suit. It is estimated that $15,000,000 worth of business will be diverted from the chain and independent grocery retailers this year by these supermarkets.

"World's Greatest Price Wrecker"



MALT MANUFACTURERS have expressed little fear for the threat which legalized beer holds over their industry. This is the interpretation placed upon expressions of opinion at the annual convention of National Malt Products Manufacturers' Association held in Chicago Feb. 6-10. The consensus is that federal, state and city taxes and license fees will make the prices of beer high and continue the demand for malt products in the making of home brew.

At the Chicago meeting, the same group of officers was reelected. H. Perlstein, Premier Malt Products Co., Peoria, Ill., is president and director; G. R. Potts, P. Ballantine & Sons, Newark, N. J., is vice-president and director; and S. L. Goldman, Chicago, is secretary and treasurer.

FOODS are taking to the air in a big way. We are not speaking of overrun, but of the fact that 40 food manufacturers, representing more than 100 products, are

—AND THE NEXT

APRIL

3-4—Bakery Sales Promotion Association, annual meeting, President Hotel, Atlantic City, N. J. Frank J. Nemetz, secretary, 1135 Fullerton Ave., Chicago, Ill.

8-10—Specailty Bakery Owners of America, annual meeting and exhibition, Chateau de Luxe Hall, New York, N. Y. Jacob Walters, secretary, 189 Second Ave., New York, N. Y.

22-29—New York, Pennsylvania and Potomac States Bakers' Associations, annual meeting and cruise to Havana, Steamer "Oriente," New York, N. Y. L. A. Schillinger, 595 Madison Ave., New York, N. Y.

26—American Dry Milk Institute, annual meeting, Chicago, Ill. Roud McCann, director, 221 North La Salle St., Chicago, Ill.

entertaining the public and, incidentally, describing their products, over the National Broadcasting Co.'s network. And eight companies are advertising on the Columbia system. Their programs cover a wide range, including educational talks, dramatics, comedy and music.

Among the N.B.C. broadcasters are Standard Brands, General Foods Corp., Great Atlantic & Pacific Tea Co., W. K. Kellogg Co., National Sugar Refining Co., Tastyeast, Inc., and Carnation Co. The list on the Columbia system includes Cream of Wheat Corp., Hecker H-O Co., Inc., General Mills, Inc., W. K. Kellogg Co., Best Foods, Inc., General Baking Co., Corn Products Refining Co., and Grocery Store Products, Inc.

During 1932, food manufacturers spent $9,160,711 advertising over the N.B.C. network and $2,136,516 on the Columbia system. This is an increase of $2,340,256 over the previous year.

Quick-Freezing of Pork

"Quick-Freezing Destroys the Parasites of Trichinous Pork." This is the title of a paper presented by Donald L. Augustine, of the Harvard Medical School, before a meeting of the Society of Parisitologists of the American Association for the Advancement of Science. The importance of this paper is evidenced by the title, and a report on it will be published in a future issue of FOOD INDUSTRIES.

Books Received

AGRICULTURAL RUSSIA AND THE WHEAT PROBLEM. By Vladimir P. Timoshenko. Food Research Institute, Stanford University, Calif. $4.

A SELECT, ANNOTATED BIBLIOGRAPHY ON THE HYGIENIC ASPECTS OF ALUMINUM AND ALUMINUM UTENSILS. Bibliographic Series Bulletin No. 3. Mellon Institute of Industrial Research, Pittsburgh, Pa.

AUTOMATIC CONTROL OF REFRIGERATION. By H. T. Lange and A. B. Schellenberg. Alco Valve Co., St. Louis, Mo. $1.50.

FLORIDA FRUITS AND VEGETABLES IN THE COMMERCIAL MENU. By Mary A. Stennis. Bulletin No. 50. Department of Agriculture, Tallahassee, Fla.

FOOD PRODUCTS DIRECTORY, PACIFIC COAST AND ROCKY MOUNTAIN STATES, 1932-33. W. J. McCamman, 1202 Hearst Bldg., San Francisco, Calif. $6.50.

MANUAL OF MICROBIOLOGY. By Walter L. Obold and Margaret M. Diehm. F. A. Davis Co., 1914 Cherry St., Philadelphia, Pa. $1.25.

100,000,000 GUINEA PIGS. DANGERS IN EVERY-DAY FOODS, DRUGS AND COSMETICS. By Arthur Kallet and F. J. Schlink. Vanguard Press, Inc., 100 Fifth Ave., New York, N. Y.

PH AND ITS PRACTICAL APPLICATIONS. By Frank L. La Motte, William R. Kenney and Allen B. Reed. Williams & Wilkins Co., Baltimore, Md. $3.50.

TEMPERATURE AND HUMIDITY MEASUREMENT AND CONTROL HANDBOOK. By M. F. Behar. Pittsburgh Instruments Publishing Co., Pittsburgh, Pa. $4.

Packaged Beer

Among the things being done to get ready for beer is the development of a wide variety of packages to facilitate the sales of beer in cartons and containers. These are newly designed beer packages getting a customer test at the Robert Gair laboratory store.

Vitamin Advisory Board Organized Here

So that international vitamin standards may be prepared and distributed within the United States, the Pharmacopoeial Vitamin Advisory Board has been organized with the approval of the United States Pharmacopoeial. The board consists of Lafayette B. Mendel, Yale University; H. B. Sherman, Columbia University; E. M. Nelson, Protein and Nutrition Division, Bureau of Chemistry and Soils; E. F. Kelly, Baltimore, Md., representing the U.S.P. Board of Trustees; and E. Fullerton Cook, Philadelphia, representing the U.S.P. Committee of Revision.

The following program is announced for distribution of vitamin standards in the United States: Scientific laboratories and research workers may obtain the international standard carotene, for vitamin A, also the international standard irradiated ergosterol for vitamin B and the international standard activated clay for vitamin B, either through E. M. Nelson, Protein and Nutrition Division, Bureau of Chemistry and Soils, or through the U. S. Pharmacopoeial Vitamin Advisory Board, 43d St. and Woodland Ave., Philadelphia.

The international vitamin standards are issued to serve only in vitamin assays. The quantities distributed are suitable only for assays with small laboratory animals such as rats, pigeons and mice.

Dairies Must Pay Tax

Dairies are engaged in a commercial enterprise when they prepare milk for retail purposes, and they must pay a tax on the electrical energy used in the operation. This is in accordance with a ruling of Feb. 15, by the Internal Revenue Bureau. However, the Revenue Act of 1932 does not apply to electrical energy used in the manufacture and sale of butter, cheese and similar products.

Court Holds Packers Liable

Packers and canners are liable for the quality of canned and bottled foods rather than the retailer, according to a decision made by the Mississippi Supreme Court, Jan. 30. Kroger Grocery Co. won the decision in a suit based upon the contention that members of the family of the plaintiff became ill after eating tomatoes purchased from a Kroger store. The court held that the retailer who purchased goods from a reliable manufacturer was not liable.

Plan Engineering Week

What probably will be the largest gathering of engineers in history will be seen at Chicago during Engineering Week, June 25-30. Plans for this huge conference of engineers is being sponsored by the Century of Progress Exposition, and it is announced that some 20 of the national engineering societies will participate with sectional and national meetings. The combined membership of the engineering groups totals 91,600.

During Engineering Week, the Sixth Midwest Engineering and Power Exposition will be held at the Coliseum.

Concentrates

National Preservers' Association has approved a plan to adopt a quality seal. . . . National Fruit and Vegetable Transportation Committee, representing interests handling 95 per cent of the rail shipments of fresh fruits and vegetables, has appealed for lower freight rates. . . . Questionnaires are being sent out for the fifth annual survey of the mayonnaise industry. . . . Simplified practice recommendations covering fiber boxes for canned fruits and vegetables have been adopted. . . . . The Port of Vancouver now has a storage capacity of 1,715,000 bu. of wheat, the largest of any ocean port. . . . "Solid Pack" should be restricted to products prepared without the addition of water in any manner, packers are warned. . . . Can and tin-plate manufacturers will underwrite advertising for canned foods for 1933. . . . Tap holes should be reamed out for succeeding sap runs, as every new hole affects the adjacent wood. . . . Not a single death from botulism has been traced to commercially canned goods in America in many years. . . . The plan to preserve perishables with inert gas will not down; during the past month efforts have been made to interest transportation companies in the proposal. . . . When farmers in the Boston milk shed controlled 88 per cent of the milk in that area they received 40 cents per 100 lb. more than New York State dairymen. . . . Japan is canning mandarin oranges and exporting them to the United States and England, and shipments are expected to increase. . . . Fifty per cent of the retail stores transact 91.4 per cent of the business. . . . Confectionery chains show the highest gross margin of all chains, with 49.3 per cent; combination grocery and meat chains are lowest with 19.3 per cent. . . . In two years, retail milk prices have dropped 31 per cent in New York City, while farm prices have dropped 58 per cent.

ABSTRACTS OF CURRRENT LITERATURE

SPOILAGE OF MAPLE PRODUCTS BY MOLDS. Carl R. Fellers, Massachusetts State College, Amherst, Mass. (Abstract of paper read before the Society of American Bacteriologists, December, 1932.)

Tub maple sugar contains 5-12 per cent moisture and actively supports the growth of certain molds, principally Penicillia. Long continued growth of these molds produces off-flavors both in the sugar and in the pure and blended table syrups made from the maple sugar. Mold-infected maple sugar often becomes moist or semi-liquid, due to the inverting action of invertase on a part of the sucrose. The invert sugars thus formed are liquid and cause the "sweating, or runny," condition so often encountered. Both the growth of mold and the inversion of the sucrose are accelerated at higher temperatures. Normally these defects are most frequently encountered in warm weather or in sugars not held in cold storage. Because of non-crystallization, maple sugar softened or partly liquefied by the action of molds cannot be used for the manufacture of solid maple candies or fondant. Among the sources of contamination of maple sugar are wooden and tin containers and papers used for wrapping or covering. Mold spores do not survive the usual open-kettle sap-concentrating process. Direct microscopic examination, using a Howard mold counting cell, enables the analyst to form an intelligent opinion of the mold content of the sugar and its probable suitability for storage or manufacture.

* * *

THE ADDITION OF VITAMIN D CONCENTRATE TO MILK. T. F. Zucker. *American Journal of Public Health*, Vol. 23, pp. 10-12; January, 1933.

This subject is discussed from a public health point of view and raises questions which include the following: (1) Can a milk of sufficiently constant potency be produced regularly in a dairy? (2) Is there any danger either to the consumer's health or otherwise in putting this "vitamin D" milk on the market?

* * *

STARCH GELS. J. A. van der Hoeve. *Chemisch Weekblad*, Vol. 30, pp. 87-89; Jan. 21, 1933.

The peculiar behavior of starch in water is explainable in terms of the lyotropism of starch granules. For example, a starch granule may remain intact in water at 55 deg. C. and swell to 64 times its initial volume at 60 deg. C. With powdered starch in water, the result is an enormous increase in viscosity; a starch gel is formed. The temperature at which this gelation occurs varies considerably for different starches, but the process is the same. From the lyotropic standpoint, it is a matter of overcoming resistance; the starch granule is composed of partially dehydrated amylose micelles, held together by capillary films of liquid. In water, the micelles tend to absorb water, but the capillary liquid films tend to prevent the absorption. Under the influence of a temperature at which this resistance is sufficiently weakened, the absorption tendency prevails and the starch swells to a gel. In the various processes which involve the making of such gels, a certain amount of control can be exercised over the swelling because the gelation temperature can be changed in a variety of ways, both chemical and mechanical. Very fine grinding lowers the gelation temperature; small quantities of electrolytes, such as salt, generally raise it.

* * *

HYDROGENATING FISH OILS. Sei-ichi Ueno and Riichiro Yamasaki. *Journal of the Society of Chemical Industry* (Japan), Vol. 35, pp. 492-495B; November, 1932.

Corrosion of piping and apparatus by volatile products of the reaction and the vile odor of some of the volatile products are the two principal difficulties encountered in the hardening of sardine oil, herring oil and the like by catalytic hydrogenation. Although these volatile products amount to only about 0.2 per cent of the material being treated, considerable quantities accumulate in commercial operation. A thorough chemical study of the problem revealed certain aldehydes as the principal source of the vile odor. Another odor, less disagreeable, was traced to certain volatile fatty acids, which are also to blame for corrosion troubles. Present were acids with 4, 5, 6 and 7 carbon atoms; also acids with 14, 15, 16, 17 and 18 carbon atoms, but none with from 8 to 13 carbon atoms. This peculiarity is traced to the nature of the fatty acids in the fish oils, and to their decomposition products. To overcome corrosion and objectionable odors, escape of these volatile products must be prevented.

* * *

FERMENTATION OF SUGARS. Mario Giordani. *Giornale di chimica industriale ed applicata*, Vol. 14, pp. 597-600; December, 1932.

War-time researches in Germany, spurred on by shortage of natural oils and fats, developed the use of sodium sulphite in yeast fermentation of sugar mashes for large-scale production of glycerol. Further study has now brought out the fact that addition of sodium sulphate to the mash substantially increases the yield by repressing the dissociation of the acetaldehyde-sodium sulphite complex. For example, an average glycerol yield of 18.8 per cent (based on the sugar) was obtained in nine fermentations without sodium sulphate, whereas with a high concentration of sodium sulphate and the same quantity of sodium sulphite as before, the glycerol yield was 24.8 per cent as the average of 25 fermentations.

DUM PALM NUTS. I. Ubaldini and L. Bissi. *Giornale di chimica industriale ed applicata*, Vol. 14, pp. 555-562; November, 1932.

The dum palm, a product of Erythrea in Africa, received little attention until an Italian government institute in 1931 issued a monograph about the plant and its uses. The nut is somewhat like the corozo nut, but has an unusual chemical composition in that it contains much mannocellulose and pentosans. One result of this is that a high yield of sugar is easily obtained by hydrolysis; 80 per cent or more of this sugar is mannose. Hitherto, utilization of the nuts has not been extensive, buttons from the hard inner shell being the principal product; but it now appears that much better uses can be found. The kernel of the nut contains a fair quantity of fat, resembling cocoa butter in odor. However, separation of kernel and shell presents mechanical difficulties, and it appears that the carbohydrate content is more important on account of the high yield of fermentable sugars (chiefly mannose) which can be easily obtained. Moreover, a more valuable product than buttons is readily available by carbonization; a high-grade and very active carbon is produced, which is especially suitable for refining and decolorizing oils and fats.

* * *

FACTORS INFLUENCING THE DETERIORATION OF BEET SUGAR. G. Mezzadroli and others, *Ind. Sacc. Ital.*, Vol. 24, pp. 154-161 (1931). [From *British Chemical Abstracts*, B, p. 1050; Dec. 2, 1932.]

The hygroscopic tendency of raw beet sugar must be attributed, not to its mineral impurities, but rather to its colloidal content, mainly pectin substances, occluded in the crystals.

* * *

STUDIES ON THE NATURE OF ANTIOXYGENS PRESENT IN NATURAL FATS. II—SOME FURTHER OBSERVATIONS ON THE REMOVAL OF ANTIOXYGENS FROM OLIVE OIL AND LINSEED OIL. A. Banks and T. P. Hilditch. *Chemistry and Industry*, Vol. 51, pp. 411T-414T; Dec. 23, 1932.

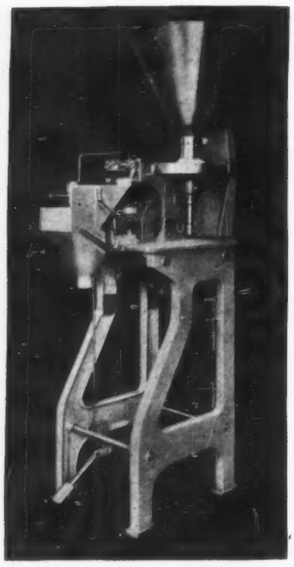
The natural "antioxygens" present in olive oil and linseed oil can be for the most part removed by boiling the oils with water. Addition of about 0.03 per cent of quinol to olive oil from which the natural "antioxygen" has been removed produced a resistance to oxygen absorption of about the same order as that of the original oil.

* * *

NEW SYMPTOMS IN VITAMIN G DEFICIENCY. S. G. Smith. *Proceedings of the Society for Experimental Biology and Medicine*, Vol. 30, pp. 198-200; November, 1932.

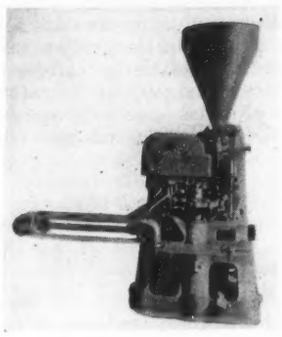
The diversity of symptoms resulting from vitamin G deficiency and lack of uniformity of results even in the same laboratory lead to confusion in evaluating the real significance of any one symptom. Microscopic sections made from the tails of all rats having a characteristic dermatitis showed very characteristic changes in the skin. The experiments suggest that a new assay method for vitamin G may be developed by correlation with the microscopic changes so observed.

NEW EQUIPMENT FOR



Machines Fill Variety of Packages

Two filling machines said to handle successfully a variety of products with greater ease and at lower cost than is possible with any other equipment have been developed by Stokes & Smith Co., Philadelphia, Pa. One is a conveyor net-weight scale for packaging hard candies, nuts in shell (or meats), potato chips and flaked materials, short cuts of macaroni and spaghetti, and a variety of similar materials. It will fill from 15 to 30 bags per minute and will handle packages weighing up to 2 lb. or having a volume as high as 220 cu.in. An air-blast device for opening the bags is furnished The other machine fills by volume instead of weight. It has a production speed of from 20 to 30 units per minute and handles packages weighing from 1 oz. to 1 lb. It is suitable for such materials as salted and shelled nuts, tea, whole spices and flaked cereals.

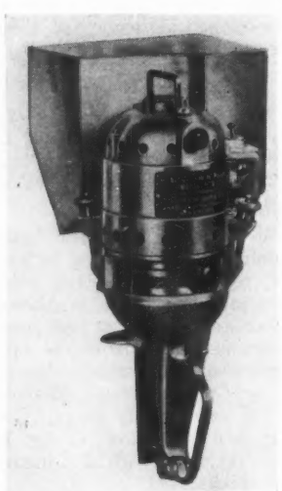


Clipless Tubes

Collapsible tubes are automatically filled and sealed with a clipless closure by a machine announced by F. J. Stokes Machine Co., Philadelphia, Pa. The new machine, the 90-D model, closes the tubes with a quadruple tuck-type fold sealed by deep indentations which weave the metal together. In filling the tubes, the machine raises the "empties" around a filling nozzle and lowers them as the level of the material rises. A thumbscrew adjustment regulates the amount of fill. Waste is prevented by a "no tube-no fill" device.

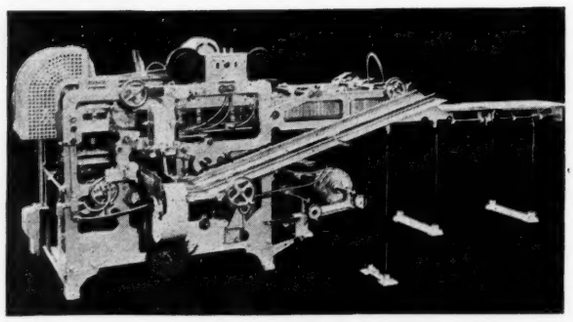
Elevator for Trucks

Heavy and bulky material may easily be loaded onto trucks by a power-operated built-in platform lift announced by Silent Hoist Winch & Crane Co., 762 Henry St., Brooklyn, N. Y. The lift is ordinarily installed at the rear and used as the tailgate for the body, but it can also be furnished for side loading. The lift is operated by a power reversing drum winch with automatic limit stops and controls located at the rear of the truck or in the cab. The winch takes its power from the truck motor and will handle loads ranging from 1 to 5 tons.



Machines Paints By Centrifugal Force

No air compressors are needed with the mechanical painting device developed by Electrical Painting Equipment Co., Inc., Grand Central Palace, New York, N. Y. Paint drawn up from the handle by a worm screw passes through an atomizing cone into a distributor comb and is ejected by centrifugal force in the form of a flat stream. The width of the spray can be regulated from ¼ to 18 in. The unit will finish 1,200 sq.ft. in an hour, giving complete coverage in one operation. It may be used for trimming, stippling or stenciling. The machine leaves the air free from dust and paint fog.



Improved Wrapping Machine

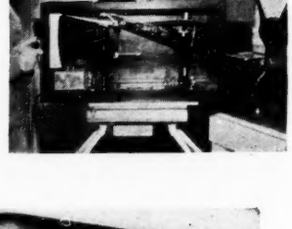
Several different products covering a wide range in sizes can be wrapped with the National bread-wrapping machine announced by Baker-Perkins Co., Inc., Saginaw, Mich. The machine handles products from 7¼ to 18 in. long, 3 to 8 in. wide and 2½ to 6 in. high. Other advantages also are attributed to the wrapper. Several feet in the length of the machine is saved by a water-cooled discharge conveyor which causes the wax to harden quickly. This is said also to make a better seal without excessive end pressure and regardless of room temperature. Other improvements include a feed mechanism which permits the tightness of the wrap to be regulated and separate rheostat controls for the bottom and side heaters. The National handles both heat-sealing waxed paper and heat-sealing transparent cellulose.

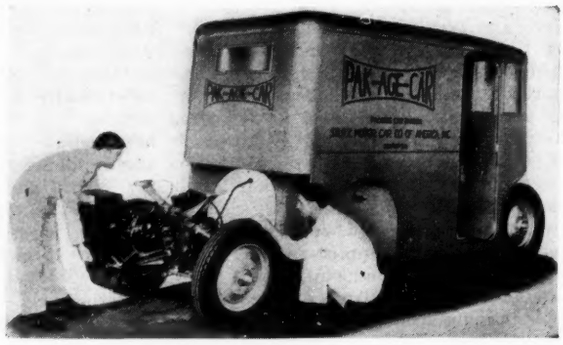
Truck Embodies Revolutionary Design

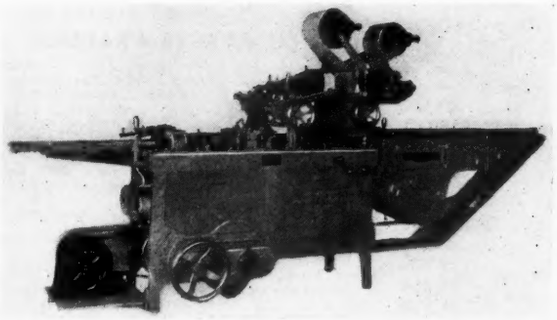
Revolutionary design characterizes practically every unit of the Pak-Age-Car manufactured by Stutz Motor Car Co. of America, Inc., Indianapolis, Ind. This machine is a light delivery vehicle built to compete with the horse and wagon. Most unusual of its features is the power unit, the "mechanical horse." It consists of the engine and all of its accessories, the clutch, transmission and final drive assembled as a unit in conjunction with the rear springs and wheels and swinging axles. The entire power plant can be replaced on the street within 15 minutes without disturbing the load. This is made possible because the all-steel body serves as the frame. The car has no axles of the conventional form, independent springing being used for all wheels. To provide convenience in operation the truck is equipped with a "3-in-1" control lever. Moving this lever upward automatically engages the clutch and accelerates the truck. Moving it to a central position disengages the clutch for coasting and moving it downward applies the brakes. The standard body of the Pak-Age-Car has a volume of approximately 260 cu.ft.

Inertia Scale Is Fast and Accurate

Laboratory precision is combined with the speed of an automatic scale in the Toledo Dynamic Weigher announced by Toledo Precision Devices, Inc., Toledo, Ohio, according to the manufacturer. The device is said to be of importance to manufacturers packing high-priced commodities, such as teas and spices, since the machine instantly determines mass by measuring inertia. This is done while the scale is in motion, and speed is obtained because it is unnecessary to wait for the scale indicator to come to rest. Indication is automatic. Models can be furnished with total capacities ranging from one gram (reading to milligrams) up to 10 kilograms (reading to grams).







Machine Wraps Three Butter Prints

Unusual flexibility makes it possible for the automatic Triplex wrapping and cartoning machine made by Automat Molding & Folding Co., Toledo, Ohio, to package butter in either 1-lb., ½-lb. or ¼-lb. units. The machine will wrap and carton pound solids, either single or double wrapped, at a rate of 4,800 lb. per hour. By simple dial adjustment, it may be made to package twin halves at a rate of 2,400 lb. per hour, or quarters at a rate of 1,500 lb. per hour, wrapping and automatically inclosing the pieces in a standard pound carton. In addition to the three-size-print feature of the Triplex, it has an improved parchment feeder that may be raised or lowered to accommodate the different sizes of wrappers. By the use of a heat-treated aluminum alloy, the weight of moving and reciprocating parts has been reduced 62 per cent and quieter operation obtained.

THE MANUFACTURERS OFFER

Laminated Containers — The automatic laminated tube winder made by M. D. Knowlton Co., Rochester, N. Y., is described, together with the different types of containers which it will produce, in a 4-page folder leaflet by the company. Transparent cellulose containers with ends of tin may be made with this machine.

Laminated Packaging Materials—A full line of laminated materials for packaging purposes is announced by W. Ralston & Co., Inc., Niagara Falls, N. Y., by sample kits in folder form.

Closures—"From Every Point of View" is the title of a publication by Anchor Cap & Closure Corp., 22 Queens St., Long Island City, N. Y., which points out the various viewpoints which the successful container must satisfy.

Packaging Machines — A loose-leaf binder containing some 60 separate bulletins on stapling machinery ranging from single-function machines to the more complete, fully automatic units for handling wood, fiber and paperboard packages is offered by Saranac Machine Co., Benton Harbor, Mich. An index is included.

Glass-Lined Equipment — Pfaudler Co., 89 East Ave., Rochester, N. Y., presents its "Junior Series" glass-lined steel containers, mixers and storage tanks with capacities of 5 to 50 gal., in its 4-page bulletin, No. 741.

Milk-Bottle Caps—In a 4-page folder leaflet, Standard Cap & Seal Corp., 1200 Fullerton Ave., Chicago, Ill., presents its paper hood seal for milk bottles, and illustrates the machinery used in applying the seal and locking it on with a soldered wire.

Paper Cartons—A chart showing popular styles of folding paper cartons and some 20 illustrations showing these cartons in use give practical value to a 16-page booklet by Campbell Paper Box Co., South Bend, Ind. Displays and paper tags also are covered.

Weight List—A net weight list for canned food products, giving the weight agreed upon by Conference Committee of Distributors, Brokers and Canners Associations, has been printed by National Canners' Association, 1739 H St., N.W., Washington, D. C.

Blowers — Single-stage turboblowers manufactured by Allis-Chalmers Manufacturing Co., Milwaukee, Wis., are described in a folder-leaflet of the company. Construction and operating characteristics are given.

Stokers — An 8-page, illustrated bulletin presenting the construction features and applications of the Patterson heavy-duty underfeed stoker is offered by Patterson Foundry & Machine Co., East Liverpool, Ohio.

Laboratory Equipment—Leaflets describing the bi-metal Thermoregulators, electric heaters and constant-temperature baths manufactured by American Instrument Co., Inc., Washington, D. C., are offered by the company.

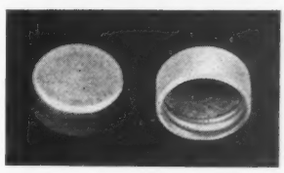
Holder System — The construction, operation and advantages of the tank holder system of Creamery Package Manufacturing Co., 1243 West Washington Blvd., Chicago, Ill., comprise the subject matter of an 8-page illustrated bulletin, C-459. Another 8-page bulletin, K-424, deals with the company's short-barrel, large-diameter churns.

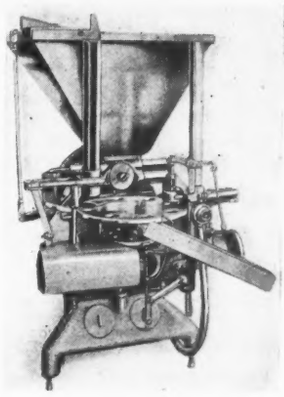
Transparent Milk Bottle Seal

Sales appeal and sanitation are provided by a transparent cellulose seal for milk bottles placed on the market by Package Machinery Co., Springfield, Mass. In addition, the seal is waterproof, tamperproof and easy to open, it is asserted. The machine for applying the seals has a capacity of 36 bottles per minute, occupies a floor space 4x5 ft., weighs 1,600 lb. net, and is driven by ½-hp. motor. The transparent sheet from which the seal is formed is fed from a roll, cut off in sections 4¼x4¾ in., formed tightly over the neck of the bottle and fastened in place by a strip of colored tape.

Smooth Screw Cap

Attractive appearance not marred by the outline of threads is provided in a new double metal cap developed by Aluminum Seal Co., New Kensington, Pa. The inner shell of this cap is seated on the container, the sealing medium is compressed and the threads are rolled into the shell in conjunction with the threads on the bottle. Then the outer shell is placed over the "roll-on" cap by an automatic machine operating in tandem with a capping machine. This outer shell is so applied that it curls under the edge of the inner one, hiding the threads.



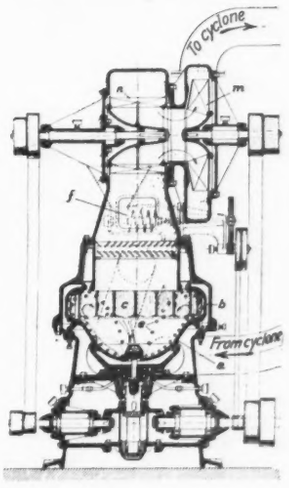


Fills Packages Of All Kinds

All standard ice cream packages can be filled and capped with the Model RC ice cream packaging machine announced by Mojonnier Bros. Co., 4601 West Ohio St., Chicago, Ill. Quickly changed attachments permit the machine to handle square, rectangular and round packages, filling them with one, two or three flavors. The ice cream is measured out and discharged by filling pistons the stroke of which may be adjusted while the machine is operating. A variable-speed device gives additional flexibility. The machine will handle packages at a rate of 60 a minute. It occupies a floor space of 3½x4 ft. The hopper has a capacity of 11 gal. in each of the three compartments; it is cork insulated and is provided with refrigerating coils.

Combination Ball Mill and Sifter

Either hard or soft materials may be ground and sifted to a high degree of fineness in a single continuous operation in a combination centrifugal ball mill and fan sifter marketed by Supex Equipment Co., 139 Charles St., New York, N. Y. Material is fed into the mill in a continuous flow by a charging device *f*, and a rotating cup, *a*, throws it and the grinding balls against the stationary grinding path *b* with considerable force, crushing the material. The balls drop back into the cup to repeat their cycle, while the ground product is ejected by the air blast produced by the fan *m* and blown into a cyclone, where it is separated from the air. Material insufficiently fine is thrown back into the grinding chamber by the revolving sifting wheel *n*, the speed of this wheel regulating the degree of fineness. All grinding elements in the unit are made of hard manganese steel, and the balls are about 18 mm. in diameter.



The combination ball mill and sifter is used for grinding and sifting cocoa cakes to a fineness of 250 mesh, with no residue. The sifter is especially adapted to sifting sugar, starch, soya bean flour and various other products to a maximum fineness of 330 mesh, or higher, with no residue. The ball mill and sifter may be had in separate units.

CONSTRUCTION NEWS

	Proposed Construction Pending	Contracts Awarded — Awarded February	Contracts Awarded — Cumulative 1933 — No. Awards	Contracts Awarded — Cumulative 1933 — Total
Bakery Products	585,000	28,000	3	86,000
Beverage	1,863,000	130,000	9	370,000
Canning and Preserving	100,000	65,000	4	115,000
Confectionery	40,000	.....	...	.....
Grain Mill Products	75,000	129,000	2	129,000
Ice, Manufactured	28,000	121,000	4	196,000
Meats and Meat Products	28,000	40,000	2	80,000
Milk Products	216,000	132,000	6	188,000
Sugar	40,000	.....	...	.....
Miscellaneous	58,000	.....	5	258,000
Total	$3,033,000	$645,000	35	$1,422,000

PROPOSED WORK BIDS ASKED

Bakery—Greensburg Baking Co., Greensburg, Pa., plans to rebuild its bakery recently destroyed by fire. Estimated cost $150,000. Traveling ovens, conveyors and other mechanical equipment will be required.

Bakery—Mattioli Bros. Baking Co., Vineland, N. J., plans to rebuild its bakery. Estimated cost $35,000. Maturity indefinite.

Bakery—National Biscuit Co., 449 West 14th St., New York, N. Y., contemplates the construction of a bakery on Cambridge St., Somerville, Mass. Estimated cost $400,000. Louis Wirsching, Jr., 449 West 14th St., New York, is architect. Maturity indefinite.

Bottling Plant—Dr. C. R. Maines, 319 West C St., Ontario, Calif., plans the construction of a plant for the manufacture and bottling of citrus fruit juices.

Bottling Plant—Union Bottling Co., Blue Rock and Delaney Aves., Cincinnati, O., plans the construction of a 2 story bottling plant. Estimated cost $30,000. Stanley Phillips, 1103 Elberon Ave., Cincinnati, is architect.

Brewery—Allied Brewing Corp., 25 Bway., New York, N. Y., plans the construction of a brewery at 43-64 Vernon Blvd., Long Island City, N. Y. Estimated cost to exceed $1,000,000.

Brewery—Isaac Dawson, 191 Elm St., New Bedford, Mass., plans alterations and improvements to its brewing plant, including installation of new equipment. Estimated cost with equipment $40,000. E. Hartmann, North Middleboro, Mass., is architect.

Brewery—Flint Brewing Co., c/o James C. Flanders, 301 Citizens Bank Bldg., Flint, Mich., plans to alter and install new equipment in its brewery. Estimated cost $30,000.

Brewery—Garden City Brewing Co., Albany Ave. at 21st St., Chicago, Ill., plans to alter and install new equipment in its brewery. Estimated cost $50,000.

Brewery—Harrison Beverage Co., Inc., R. Baar, Pres., 500 Harrison Ave., Harrison, N. J., plans to alter and improve its brewery. Estimated cost $40,000. Maturity indefinite.

Brewery—Kalamazoo Brewing Co., Kalamazoo, Mich., plans to alter and install new equipment in its brewery. Estimated cost $30,000.

Brewery—Monarch Beverage Co., 2419 West 21st St., Chicago, Ill., plans to alter and install new equipment in its brewery. Estimated cost $65,000. H. Gaul, 228 East Superior St., Chicago, is architect.

Brewery—Penton Products Co., 2421 Smith Ave., Detroit, Mich., plans the construction of an 8 story brewery. Estimated cost $400,000. Giffels & Vallet, 604 Marquette Bldg., Detroit, are architects and engineers.

Dairy—Glenwood Farms Dairy Co., 522 Bryant St., New York, N. Y., plans to alter and install new equipment in its plant. Estimated cost $28,000. Maturity indefinite.

Dairy—Midwest Dairy Products Co., El Paso, Tex., plans the construction of a dairy. Estimated cost $100,000. Guy L. Fraser, Martin Bldg., El Paso, is architect.

Dairy—Puritan Dairy, 315 High St., Perth Amboy, N. J., plans the construction of a dairy at Fayette and Wilson Aves., Perth Amboy. Ballinger Co., 12th and Chestnut Sts., Philadelphia, Pa., architects, will soon receive bids. Estimated cost $60,000.

Milk Plant—Sego Milk Products Co., 32 North Main St., Salinas, Calif., plans the construction of a milk plant at Hollister, Calif.

Canning Plant—Carstens Packing Co., Tide Flats, Tacoma, Wash., plans the construction of a meat canning plant.

Cannery—Walla Walla Canning Co., J. C. Kelly, Pres., Walla Walla, Wash., plans the construction of a cannery. Estimated cost to exceed $40,000.

Packing Plant—Litinsky Co., Chico, Calif., contemplates the construction of a nut shelling and packing plant. Estimated cost $30,000.

Packing Plant—Louden Packing Co., 2101 South Third St., Terre Haute, Ind., plans to remodel its packing plant. Estimated cost $29,610.

Grain Elevator and Flour Mill—Big Diamond Flour Mills, Morristown, Minn., contemplate the construction of a grain elevator and flour mill. Estimated cost $50,000.

Grain Elevator—C. G. Wolf, North Liberty, Ind., is having plans prepared for rebuilding grain elevator. Estimated cost $25,000.

Ice Plant—Freer Utilities Co., Freer, Tex., plans the construction of a 1 story ice manufacturing plant and is interested in prices of equipment. L. D. Royer, Smith Young Tower, San Antonio, is engineer. P. G. Sieler & Co., 101 West Pean St., San Antonio, are architects.

Sugar Refinery — Amalgamated Sugar Co., R. M. Cottrell, Supt., Ogden, Utah., plans to improve its refinery at Twin Falls, Idaho. Estimated cost $40,000. A. J. Forbess, Ogden, is chief engineer.

Storage Building—Joliet Macaroni Co., Joliet and Benton Sts., Joliet, Ill., plans the construction of a storage building. Estimated cost with equipment $30,000. Maturity indefinite.

Storage Building—Kings Brewery, Inc., 227 Pulaski St., Brooklyn, N. Y., plans to build 8 story, 48x100 ft. storage building. Estimated cost $150,000. Shampan & Shampan, 188 Montague St., Brooklyn, are architects.

Warehouse—New Jersey Candy Co., 27 Ferry St., Newark, N. J., plans the construction of a warehouse and distributing building at 159 Prince St., Newark. Estimated cost $40,000. M. Fortunato, 45 Branford Pl., Newark, is architect. Maturity indefinite.

Warehouse—North Shore Wholesale Grocery Co., 33 Park St., Beverly, Mass., is having plans prepared by S. Schein, Archt., 333 Washington St., Boston, Mass., for 1 story, 80x95 ft. warehouse.

Equipment—Oneida Brewing Co., Inc., Frank B. Steele, Pres., Utica, N. Y., plans to install refrigerating, bottling and pumping apparatus in brewery here. George A. Hahn, Utica, is engineer. Estimated cost $100,000.

Equipment—Montreal Bakery Co., Ltd., Tupper St., Sydney, N. S., Can., is in the market for equipment.

Machinery — Tasty Foods, Ltd., Winnipeg, Man., Can., manufacturer of chocolate bars, candies, etc., are in the market for machinrey.

Milling Equipment—Hunt Milling Co., Ltd., J. A. Beechie, Mgr., London, Ont., Can., is in the market for flour and grain mill equipment.

CONTRACTS AWARDED

Bakery—Fred Phelps, 678 Bergenline Ave., Union City, N. J., awarded contract for altering and building 1 story addition to bakery to Joseph Haller, 3548 Blvd., Jersey City, N. J. Estimated cost $28,000.

Brewery—Aetna Brewing Co., 130 Bellevue St., Hartford, Conn., awarded contract for rehabilitating and equipping brewery to G. Cudemo, Inc., 650 Main St., Hartford. Estimated cost $30,000.

Brewery—Fidelio Brewery, Inc., 501 1st Ave., New York, N. Y., N. S. Goldberger in charge, awarded contract for altering brewery to H. M. Weitzner, 225 West 34th St., New York, N. Y. Estimated cost $30,000.

Brewery—Liebman Breweries, 36 Forrest St., Brooklyn, N. Y., awarded contract for altering brewery to Sol Lustbader, 119 West 57th St., New York, N. Y.; tank and storage unit to Atlantic Tank Corp., Tonnele Ave., Palisade, N. J.; subcontract for tank materials to Hammond Lumber Co., 370 Lexington Ave., New York, N. Y. Estimated cost to exceed $30,000.

Brewery—Wehle Brewing Co., Campbell Ave., West Haven, Conn., awarded contract for addition to brewery, including bottling plant and boiler plant, to National Construction Co., 152 Temple St., New Haven. Estimated cost $40,000.

Dairy—Clover Farms, Inc., Sedgewick St., Bridgeport, Conn., awarded contract for dairy to George E. Clark, 343 Taft Ave., Bridgeport. Estimated cost $29,000.

Dairy—State of California, G. B. McDougall, Archt., Sacramento, awarded general contract for dairy units at State Hospital at Talmadge, Calif., to O. S. Almlie, 414 23rd St., Merced, Calif., $44,900.

Ice Cream Plant—Country Club Ice Cream Co., 210 Crosley Ave., Paterson, N. J., awarded contract for altering plant to E. Verdum, 480 East 34th St., Paterson. Estimated cost with equipment $28,000.

Ice Cream Plant—Furnas Ice Cream Co., 131 North Alabama St., Indianapolis, Ind., awarded contract for remodeling plant to J. E. McGaughey, 8 East Market St., Indianapolis. Estimated cost $29,510.

Ice Plant—E. Kalins Sons, 3241 Spring Grove Ave., Cincinnati, O., will construct 1 story, 40x100 ft. ice manufacturing plant. Work will be done by separate contracts. Estimated cost $28,000. C. J. Kiefer, Schmidt Bldg., Cincinnati, is engineer.

Ice Plant—Samuel H. Stevens, 62 Hamlin St., South Manchester, Conn., awarded contract for ice manufacturing plant on Britton Ave., Torrington, Conn., to Torrington Building Co., 182 Church St., Torrington. Estimated cost $65,000.

Storage Plant—Lake Williams Ice Co., Marlboro, Mass., awarded contract for 2 story ice storage plant at Lincoln and Bond Sts., to T. P. Hurley Construction Co., 196 Main St., Marlboro.

Flour Mill—Acme-Evans Co., 852 West Washington St., Indianapolis, Ind., awarded contract for flour mill to C. W. Wacker, 142 West 32nd St., Indianapolis. Estimated cost $29,000.

Macaroni Factory—A. F. Ghiglione & Sons, Inc., 4715 6th Ave. S., Seattle, Wash., awarded contract for rebuilding macaroni factory recently destroyed by fire to I. Ive. Estimated cost including machinery and equipment $100,000.

Packing Plant—City Packing Co., Fostepco Heights, Ft. Worth, Tex., will build a meat packing plant by day labor. Estimated cost $40,000.

Packing Plant—Coast Packing Co., 3275 East Vernon Ave., Vernon, Calif., is building an addition to its packing plant. Estimated cost $30,000. Work is being done under supervision of James C. Barr, Engr., 2069 Randolph St., Huntington Park, Calif.

Packing Plant—East Texas Packing Co., Longview, Tex., will build a plant for packing vegetables, poultry, fish, meats, etc. Estimated cost $28,000. Work will be done by day labor under supervision of owners.

Packing Plant—Richman & Samuels, Weslaco, Tex., awarded contract for vegetable and citrus fruit packing plant to T. E. Carpenter, Weslaco. Estimated cost $7,000.

Where Carton Packaging Stands Today

(Continued from page 99)

single-pointed end lap usually is made in the absence of end-seals. Depending upon the thickness of the package and the nature of the contents, the end-seal is made across the end of the package or folded and stuck to the underside of the package.

Except in special cases, the grain of the loose label or loose wrapper runs around the package—that is, the long way of the wrapper. When it is desired to have the grain of the paper running the short way of the wrapper, papers with short fibers are specified, in order that difficulty will not be experienced with curling and with the needlepoint tear when the wrapper is pulled from the wrapper feeder. Laps on the long-side or bottom seal are from ½ to 2 in. wide, depending on the size of the carton and whether the sealing agent is wax or an adhesive. If an adhesive is used, it is essential that the gluing lap be left free from ink, varnish, wax or other surface treating agents which might prevent penetration of the paper surfaces by the adhesive.

Generally speaking, waxed wrappers are specified as 20- to 25-lb. basis paper plus 5 lb. of wax or 30-lb. basis paper plus 10 lb. of wax. However, this ratio varies considerably according to the requirements of the user. It has come to our attention that some food companies specify as unusual a ratio as 40-lb. basis paper plus 30 lb. of wax. This is such an exceptionally high ratio that it cannot be regarded as typical. The melting point of the wax used varies from 100 to 125 deg. F., depending upon the time of the year and other conditions under which it is to be used.

Tight Wrappers

Tight wrappers are both rectangular in shape and are die-cut. In this instance, the grain of the paper should run the short way of the wrapper. Otherwise, the wrapper will curl when the adhesive is applied and will stretch in width instead of length while being applied. Wrappers of this type usually are from 50- to 55-lb. basis machine-finished label stock and may be letter-printed or lithographed and, when desired, varnished. These wrappers are fully glued to all portions of the carton and are said to add materially to the strength of the board from which the carton is made and offer added resistance to losses by sifting and weevil infestation. Their length is equal to twice the width and thickness of the carton plus the width of the gluing lap—usually ½ in. The width is equal to the sum of the length and the thickness of the carton plus the width of the gluing lap—usually ½ in. Die-cutting the wrappers eliminates gusset folds on the ends of the package yet permits overlapping of cut edges to insure complete seal, if proper registry is obtained.

Carton sizes listed in the table on wrapping machines are edge-to-edge measurements and in both cases represent typical carton sizes handled by these machines. In the adjustable-type wrapping machines, replaceable units will permit cartons of varying sizes to be wrapped on the one machine, provided the proper sized replaceable part is obtained and other contributory adjustments be made. Non-adjustable machines may have a range of carton sizes for which the machine may be built, but when once built it cannot be readily converted to handle any other size carton. In some cases, due to present-day demands for flexibility, these non-adjustable machines are being converted into adjustable types.

The construction of the adjustable machine is such that by varying one dimension, greater adjustability can be obtained for another dimension. For example, if the carton thickness be lessened, the machine can be adjusted to handle a wider carton than would be possible if the original thickness were retained. For that reason, in those instances in which definite minimum and maximum carton measurements are given for adjustable machines, other combinations are obtainable by varying at least one of the dimensions.

Machines whose tolerances are listed separately in terms of minimum and maximum lengths, widths and depths should not be regarded as capable of handling a carton having a combination including the three minimum or the three maximum dimensions. Adjustments to meet the requirements of changes in carton sizes not only affect factors of machine construction but also of wrapper size. It is because of such factors as these that full consideration should be given to the production man's problem of handling the package before definite decision is made in adopting a package size or redesigning an already existing package.

Adhesives

In carton packaging, the type of adhesive most commonly used is cold paste for plain and printed wrappers, plain processed cellulose and backed foil. Heat-sealing characterizes waxed-paper wrapping and is coming into general use with moistureproof processed cellulose materials. It is used to a certain extent also with foil wrapping. In some instances packaging machines are being equipped to do either glue- or hot-sealing, as desired. Also, certain special adhesives, such as organic solvents, have been developed for use with moistureproof processed cellulose wrappers. In choosing adhesives of this type, careful consideration should be given to the presence of odor and the possible effect upon the contents of the package. Only in very special instances are hot pick-up adhesives employed in carton packaging.

When difficulty is encountered with adhesives in connection with machine wrapping, it is well to remember that builders of packaging machinery have made thorough tests of the various types or makes of adhesives and will recommend the ones which should be used on their machines to get the best results under given conditions.

Likewise in respect to other specific details which have been touched upon in a general way in this article, advice should be sought from builders of the machines being used or being considered for use. This word of caution applies particularly to label or wrapper size and composition. In matters pertaining to carton construction and wrapping materials, expert guidance should be sought from experienced carton makers and paper manufacturers whose advice in terms of machine performance by the machine builders will help solve the production man's packaging problems or, better still, help prevent him from having such problems.

Packaging Machines

During this discussion on packaging materials reference has been made from time to time to the various machine units used. Summarized briefly, they are: sealing, lining, filling and wrapping machines.

The sealing machines may be individual bottom sealers with or without mechanical feeds or they may be in combinations with lining, filling and/or top-sealing machines. Wrapping machines fall into two general classes: loose wrapping and tight wrapping.

Space does not permit us to discuss the construction and operation of each machine. Instead we present in tabular form a list of these machines, with the names of their manufacturers and such other data as we have been able to gather. We do not presume that the list is inclusive, although we have endeavored to make it as nearly so as possible.

The data given in these tables should be regarded merely as a guiding basis upon which to make general decisions. Final and explicit decisions regarding the machine to be purchased or package size to be adopted should not be made until the data included in these tables have been supplemented by more explicit data from the builders of the machines under consideration.

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